

13665

COASTAL ZONE
INFORMATION CENTER

COASTAL AREA MANAGEMENT ACT

LAND USE PLAN

N.C. COASTAL RESOURCES COMMISSION

HD268.W55C63 1976

CITY OF WILMINGTON-NEW HANOVER COUNTY

NORTH CAROLINA

HD
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1976

COASTAL ZONE INFORMATION CENTER

NOTICE TO USERS

All major policy related maps and documents are either included within the text or attached to the back of the plan. However, due to the expense and technical limitations required for reprinting some illustrations may be omitted. Complete copies are available for inspection at the N. C. Coastal Resources Commission offices in Raleigh or at the local government offices.

N.C. COASTAL RESOURCES COMMISSION



Wilmington - New Hanover Planning Commission



P. O. Drawer 1810

Wilmington, N. C. 28401

May 24, 1976

Mr. T. D. Eure, Chairman
Coastal Resources Commission
P.O. Box 650
Morehead City, N.C. 28557

Dear Chairman Eure:

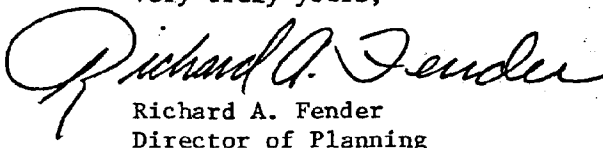
On behalf of the Wilmington-New Hanover Planning Commission, the Wilmington City Council, and the New Hanover County Board of Commissioners, I am pleased to submit "Policies for Growth and Development of the Wilmington-New Hanover Planning Area" and supporting material to the Coastal Resources Commission for review and comment. These policies have been endorsed by the Planning Commission and jointly adopted by the Wilmington City Council and the New Hanover County Board of Commissioners.

The planning process on which these policies are based has been designed to meet the guidelines of the Coastal Resources Commission; however, in meeting the particular needs of the Wilmington-New Hanover Planning Area, it has been necessary to deviate, in some cases, from the format of the traditional land use plan.

The adoption of these policies complete the first phase of a three-phase land use planning process. Phases 2 and 3 will generate more detailed land use recommendations and will develop the necessary tools to implement these recommendations.

If this office can answer any questions concerning the "Policies for Growth and Development," the technical studies, or any other part of the planning program, please feel free to contact us.

Very truly yours,


Richard A. Fender
Director of Planning

RAF/jw

cc: Mr. Peter R. Davis, Chm., New Hanover Co. Comm.
Mr. Ben B. Halterman, Mayor, City of Wilmington
Mr. Dan Eller, County Manager
Mr. John A. Jones, City Manager

RESOLUTION OF THE COUNCIL OF THE CITY OF WILMINGTON, NORTH
CAROLINA, ADOPTING A GROWTH AND DEVELOPMENT
POLICY FOR WILMINGTON AND NEW HANOVER COUNTY

WHEREAS, the Coastal Area Management Act of 1974 (G.S. 113A-107(a)) requires that each of the twenty coastal counties of North Carolina develop and adopt a policy for growth and development of that county; and

WHEREAS, a policy for the growth and development of Wilmington and the unincorporated areas of New Hanover County has been reviewed and recommended by the Wilmington-New Hanover Planning Commission; and

WHEREAS, said policy is necessary to provide for and guide the orderly growth and development of Wilmington and the unincorporated areas of New Hanover County.

NOW, THEREFORE, BE IT RESOLVED, BY THE COUNCIL OF THE CITY OF WILMINGTON, NORTH CAROLINA, AT A MEETING ASSEMBLED THIS THE 20TH DAY OF MAY, 1976 AS FOLLOWS:

That the growth and development policy for Wilmington and New Hanover County is hereby adopted for purposes of submission to the Coastal Resources Commission for their review and comment.

The foregoing resolution was duly adopted at the meeting aforesaid.

Bow B. Lattin
Mayor

ATTEST:

Claire Hughes
City Clerk

CERTIFIED TO BE A TRUE COPY

Claire Hughes
CITY CLERK

RESOLUTION OF THE BOARD OF COMMISSIONERS
OF NEW HANOVER COUNTY, NORTH CAROLINA,
ADOPTING A GROWTH AND DEVELOPMENT POLICY
FOR WILMINGTON AND NEW HANOVER COUNTY

WHEREAS, the Coastal Area Management Act of 1974 (G.S. 113A-107(a)) requires that each of the twenty coastal counties of North Carolina develop and adopt a policy for growth and development of that county; and

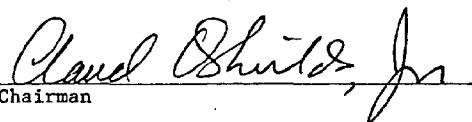
WHEREAS, a policy for the growth and development of Wilmington and the unincorporated areas of New Hanover County has been reviewed and recommended by the Wilmington-New Hanover Planning Commission; and

WHEREAS, said policy is necessary to provide for and guide the orderly growth and development of Wilmington and the unincorporated areas of New Hanover County.


NOW, THEREFORE, BE IT RESOLVED, BY THE BOARD OF COMMISSIONERS OF NEW HANOVER COUNTY, NORTH CAROLINA, AT A MEETING ASSEMBLED THIS THE 20TH DAY OF MAY, 1976 AS FOLLOWS:

That the growth and development policy for Wilmington and New Hanover County is hereby adopted for purposes of submission to the Coastal Resources Commission for their review and comment.

The foregoing resolution was duly adopted at the meeting aforesaid.


Chairman

ATTEST:


Clerk to the Board

CERTIFIED TO BE A TRUE COPY



Clerk to the Board

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I. INTRODUCTION AND SUMMARY

This report represents the culmination of the first phase of a three-phase land use planning process which is being undertaken for the Wilmington-New Hanover Planning Area. The report's primary purpose is to present to citizens and elected officials a comprehensive set of policies for the growth and development of the Planning Area. It contains five major parts:

- (1) A description and evaluation of the Public Participation Program which has been undertaken to permit full involvement of citizens in the planning process;
- (2) A set of policies which will provide principles to guide decision making at all levels of city and county government;
- (3) A General Development Guide which serves to illustrate the policies for growth and development and which will set the parameters for the development of a more detailed land use plan in the second and third phases of the planning process;
- (4) A description of potential Areas of Environmental Concern which may be designated by the North Carolina Coastal Resources Commission and a description of the land uses which may be permitted within these critical areas; and
- (5) A series of six studies which provide the technical support for the recommended policies and the General Development Guide.

The purposes of Phases 2 and 3 of the planning process are to, first, develop specific land use recommendations for the Wilmington-New Hanover Planning Area and, second, to develop the tools which will be required to implement these land use recommendations. Through this sequential process, which evolves successfully more specific land use policies, it is possible "to look at the forest before dealing with the trees."

It is projected that Phases 2 and 3 of the Land Use Planning Process will be complete by July 1977.

RELATION TO THE COASTAL AREA MANAGEMENT ACT

The Land Use Planning Process, which is currently underway in the Wilmington-New Hanover Planning Area, has been, in part, a response to the requirements of the Coastal Area Management Act of 1974 (CAMA). This legislation requires that each local government in the coastal area develop a land use plan as a part of a state-wide program for managing North Carolina's coastal resources. The legislation also created the Coastal Resources Commission which has the overall responsibility for implementing the provisions of the legislation.

Among other responsibilities, the Coastal Resources Commission was charged with developing a set of guidelines to be used by local governments in the preparation of land use plans. These guidelines which were adopted on January 27, 1975 and amended on October 15, 1975 provide general criteria for the land planning process to insure that local land use plans achieve the resource management objectives set forth in CAMA. The technical studies and analyses undertaken in Phase 1 of the planning process and the Public Participation Program have been designed to meet or exceed the requirements of the Coastal Resources Commission.

II. SUMMARY OF TECHNICAL STUDIES

Since the initiation of the Land Use Planning Process in January of 1975, a series of technical studies have been undertaken by the Planning Staff. Basically these studies have served three purposes:

- (1) To document existing conditions in terms of the Planning Area's present population, its economy, and its existing land use;
- (2) To forecast future conditions as indicated by projected employment growth and the resulting growth in total population; and
- (3) To analyze the impact of this projected growth on the Planning Area's land and public services and facilities.

These studies are listed and briefly summarized below.

A. TECHNICAL REPORT #1. AN ANALYSIS OF HUMAN RESOURCES

This report contains a detailed analysis of the Planning Area's population and economy. It outlines past growth trends in both employment and total population; it discusses the characteristics, or composition, of the area's population and its workforce; and the report provides projections and forecasts of future employment and population levels.

The U.S. Census Bureau is the major source of statistics for this report; however where appropriate census data has been "updated" using secondary sources such as school enrollment and Employment Security Commission data.

The "cohort-survival" technique was used to develop three population projections -- low, moderate, and high. Based on an evaluation of the assumptions used in these projections, the "high" projection of a population of 151,000 by 2000 is considered to be most probable. Using the projection, the Planning Area's total employment in 2000 is expected to be 74,000.

f

B. TECHNICAL REPORT #2. AN ANALYSIS OF EXISTING LAND USE

This report outlines the basic information on current land utilization which is required for developing policies for future land use. It addresses both the amount of land committed to various uses and the problems resulting from the location of existing uses and the manner in which they are developed.

The analysis is based on a survey of the Planning Area's land uses conducted in the summer of 1973 and updated in the summer of 1975.

Six major problems were identified in this study:

1. urban sprawl
2. neighborhood decline
3. strip commercial development
4. over-zoning
5. poor drainage
6. malfunctioning septic tanks

C. TECHNICAL REPORT #3. ENVIRONMENTAL ANALYSIS

This report, consisting primarily of a series of maps (submitted separately), is designed to evaluate the suitability of the Planning Area's land resources for urban-type development. Twelve separate environmental factors such as wetlands, flood plains, drainage characteristics, and historic areas were used in the analysis.

The Environmental Analysis identifies 17 square miles of land distributed throughout the Planning Area which are suited for development without extensive public investment in sewerage facilities. Centralized sewerage facilities could increase this reserve of suitable land to 52 square miles.

D. TECHNICAL REPORT #4. ESTIMATES OF FUTURE LAND NEEDS

Technical Report #4 provides estimates of the amount of land which will be required to meet the needs of the Planning Area's projected growth. These estimates were made at two levels of detail. The first level, following the guidelines of the Coastal Resources Commission, provides general estimates

of urban, rural community, and rural land needs. The second level provides detailed estimates of residential, commercial, and industrial land needs.

The two land needs estimates for the 1975-2000 planning period are summarized as follows:

<u>Gross Land Needs</u>		<u>Detailed Land Needs</u>	
<u>Category</u>	<u>Need</u>	<u>Category</u>	<u>Need</u>
Urban	22 square miles	Industrial	7 square miles
Rural Community	14 square miles	Commercial	4 square miles
Disperse Rural	19 square miles	Residential	21 square miles

E. TECHNICAL REPORT #5. AN ANALYSIS OF GROWTH ALTERNATIVES

This report compares and evaluates the costs and benefits of six growth alternatives to the Planning Area's residents. The growth alternatives were defined in terms of two variables: projected total population (low, moderate, and high) and the spatial distribution of the development generated by this growth (compact and dispersed).

Three major conclusions have been drawn from this study:

1. Growth has positive impacts on the local economy -- incomes and retail sales increase with growth.
2. The per capita costs of public services remain relatively constant as population increases, but the per capita costs of providing services to a dispersed development pattern are much higher than for a compact development pattern.
3. With proper public investment in sewerage facilities, all three growth levels evaluated can be accommodated on environmentally suited land.

F. TECHNICAL REPORT #6. SEPTIC TANK PROBLEMS

Technical Report #6 is a "special" study undertaken as a result of the Coastal Resources Commission's expanded concern for the water quality problems caused by conventional septic tanks.

The report outlines the dimensions of the Planning Area's existing septic tank problems -- at least 19 subdivisions are presently experiencing chronic septic tank problems. It also identifies the amount of land remaining which is suited for septic tanks -- 17 square miles. It is estimated that this land could support a maximum of 34,000 additional people.

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III. SUMMARY OF EXISTING PLANS AND POLICIES

The Coastal Resources Commission's planning guidelines require that local land use plans contain a listing and summary of existing plans and policies having significant implications for future land uses. In accordance with this requirement, the following table contains a list of relevant plans, studies, and ordinances which have been prepared or enacted in the Wilmington-New Hanover Planning Area. From this list, the Wilmington Area Thoroughfare Plan, the Greater Wilmington 201 Facilities Plan, the Lower Cape Fear Regional Water Supply Plan, and the Wilmington Housing Assistance Plan have been summarized.

- A. Wilmington Area Transportation Study, prepared by Wilbur Smith and Associates for the N.C. State Highway Commission in cooperation with the City of Wilmington, New Hanover County, and the U.S. Department of Transportation Federal Highway Administration.

Wilmington and New Hanover County comprise the most urbanized area in southeastern North Carolina. The State Port, located at Wilmington, is one of two major seaports serving North Carolina. The growth in population, trade and industry has resulted in an increasing demand for more and better transportation facilities.

In January 1972, "The Wilmington Area Transportation Study" was accepted by the City of Wilmington as a measure of existing and projected transportation needs. (The Thoroughfare Plan was last revised by the City of Wilmington in May 1973). The Thoroughfare Plan as it shall hereafter be called is intended to serve as a plan for a street and highway system which is adequate to accommodate the transportation demands for the design year 1995.

The study area encompasses the Wilmington urbanized area which is approximately 114 square miles in area. Communities in New Hanover County excluded from the study were Carolina Beach, Kure Beach, Wrightsville Beach, and Castle Hayne.

LIST OF RELEVANT PLANS, STUDIES, AND ORDINANCES

PLANS AND ORDINANCES	DATE OF ADOPTION AND/OR REVISION
NEW HANOVER COUNTY	
1. Zoning Ordinance	October 1969
2. Subdivision Regulations	February 1969
3. Building Code	March 1965, update May 1968
4. Septic Tank Regulations	February 1975
5. Soil Erosion and Sedimentation Control Ordinance	July 1974
6. Dune Protection Ordinance	December 1972
7. Land Development Plan	April 1969
8. Preliminary Report on Wind Tide Flooding	December 1969
WILMINGTON	
1. Zoning Ordinance	Readopt June 1972, update Aug. 19
2. Historic District Zone	June 1972
3. Subdivision Regulations	May 1974
4. Building Code	Adopted December 1941, readopted
5. Land Use Plan	May 1975
6. Wilmington Area Thoroughfare Plan	1966
7. Community Facilities Study	May 1973
	December 1971
JOINT PROGRAMS	
Parks and Recreation Master Plan	March 1976
REGIONAL PROGRAMS	
1. 201 Facilities Plan (Draft)	November 1975
2. Lower Cape Fear Regional Water Supply System	December 1975

The current roadway in the study area consists of 140 miles, the Recommended Thoroughfare Plan consists of 204.8 miles of roadway. As shown in Table 1, freeways and major thoroughfares comprise a majority of the recommended roadway network mileage for the year 1995.

Table 1
Total Network Mileage
1995 Recommended Thoroughfare Plan

Components	Total Miles	Percent of Total
Freeways	34.6	16.7
Major Arterial	132.6	64.7
Minor Arterial	37.6	18.4
Total	204.8	100.0

Large portions of new mileage will be required to meet the 1995 traffic demands in the Wilmington area.

The following new facilities are included in the Thoroughfare Plan:

1. Circumferential Freeway System, beginning at U.S. Route 17 in Brunswick County and extending northerly around the study area and intersecting with Shipyard Boulevard south of the City, is the major network addition. Future volumes assigned to this facility range from approximately 7,000 vehicles per day on the portion west of the Cape Fear River to approximately 25,000 vehicles per day on segments south of Shipyard Boulevard.
2. The Smith Creek Drive Arterial is proposed as a four-lane, divided roadway extending from U.S. Route 74 east of the City to U.S. Route 117 near the Northeast Cape Fear River. An extension of this facility will run southwardly to the Cape Fear River along Water Street. Projected 1995 traffic on segments of this facility will reach approximately 12,000 vehicles per day.
3. The University Drive facility should be constructed as a four lane major arterial north of and running generally parallel to Wrightsville Avenue. This will provide for an additional travel route in the Oleander-Wrightsville Avenue Corridor. Anticipated traffic volumes on this facility will range between 15,000 and 20,000 vehicles per day in 1995.
4. McRae Avenue to begin at Castle Hayne Road (U.S. 117) near Smith Creek and extend to Grace Street to serve north-south traffic in and out of downtown area with estimated 1995 traffic volumes on this two lane facility range to 7,500 vehicles per day.

5. Independence Boulevard will form the principal north-south travel route in the City. A new facility connecting 23rd Street and Independence Boulevard will extend from Montgomery Avenue at Princess Place Drive to 23rd Street near U.S. Route 117. Other elements of the Independence Boulevard include a new facility south of the present Independence Boulevard extending across Shipyard Boulevard to the proposed southeast freeway segment. Major improvements are also recommended for intersections along existing Independence Boulevard. The 1995 traffic volumes along this route will be about 13,000 vehicles per day.

In addition to the construction of new roadways, an extensive widening program is included in the plan. Major widening projects are recommended for such facilities as Castle Hayne Road, Shipyard Boulevard, Princess Place Drive, Wrightsville Avenue, Oleander Drive and N.C. Route 132.

- B. The Greater Wilmington Area 201 Facilities Plan Part II (Henry Von Oesen and Associates, Inc. Consulting Engineers and Planners, Wilmington. November 1975.

In an effort to improve and expand public utility services to meet the growth and public health demands of the area, New Hanover County, Wilmington, and Wrightsville Beach have begun preparation of a 201 Facilities Plan. As a result of the increase in population and extensive development in the Wilmington area, there has been an increasing demand for water and sewer services necessary to maintain the quality of life and protect valuable natural resources.

The U.S. Environmental Protection Agency publication, Guidance for Preparing A Facilities Plan, requires that any construction of waste water treatment and disposal facilities, for which federal financial assistance is sought, must be preceeded by a 201 Facilities Plan, which demonstrates the need for the proposed facilities and establishes that the proposed measures represent the most economical (cost-effective) means of meeting established (effluent and water quality goals) compatible with local environmental and social factors. The 201 Facilities Plan for the Greater Wilmington Area is being prepared to comply with the "E.P.A. Guidelines for a Facilities Plan" and the "Federal Water Pollution Control Act Amendements of 1972". The Greater Wilmington

Planning Area encompasses the City of Wilmington, Town of Wrightsville Beach and a large portion of the unincorporated areas of New Hanover County.

The following considerations and work tasks of the 201 Facilities Plan are summarized as follows:*

- a. A discussion of water quality objectives and other management goals.
- b. An environmental inventory to identify natural, ecological and cultural values that will influence the conclusions and recommendations ultimately reaches in the study.
- c. A summary of pollution sources, waste loads and water quality.
- d. An inventory of existing wastewater treatment and collection systems.
- e. An evaluation of the condition and performance of existing wastewater collection and treatment facilities.
- f. A study to determine the existence or non-existence of excessive infiltration of inflow into existing wastewater collection systems and a determination of the requirements for further study of the removal of excessive infiltration/inflow.
- g. An identification of potential sewerage service areas.
- h. A development of alternative schemes for wastewater treatment and disposal and sludge handling and disposal.
- i. A cost effective analysis of alternatives.
- j. An environmental evaluation of alternatives.
- k. Final selection of the recommended facility plan and development of a plan and schedule for implementation.
- l. Public meetings to present the report and its conclusions to the public and to receive input from interested local citizens.
- m. Publication of the final 201 Facilities Plan (incorporating results of public input).

The period covered by the "201 Plan" is 20 years beginning with the initial operation of the treatment works. The 20 year period is generally set for 1975 to 1995. Existing facilities now in operation will be used

* Henry Von Oesen and Associates, "Greater Wilmington Area 201 Facilities Plan," November 1975, (Draft).

and expanded to meet future needs and fundings as a result of recommendations in this plan, e.g. an infiltration/inflow evaluation program and sewer system rehabilitation project in the City of Wilmington, are to begin during 1975. Certain phases of the 20 year planning period goes beyond the year 1995 to year 2000. This is necessary to plan for new intercept or sewers in New Hanover County which will not begin operations until about 1980. Therefore, the planning period for new interceptors in this plan is set for 20 years (1980 to 2000) and 20 years for treatment works (1975 to 1995). The first ten years of the planning period (1975 to 1985) are the most critical for it is during this period that longstanding serious water quality problems will be corrected. The New Hanover County Commissioners and the Wilmington City Council believe that the 201 Facilities Plan will improve environmental conditions in New Hanover County and provide the county with cleaner water and an adequate wastewater collection and treatment system.

- c. Regional Water Supply System, Lower Cape Fear Water and Sewer Authority by O'Brien and Gere Engineers. December 1975.

The Lower Cape Fear Water and Sewer Authority was formed to implement water supply projects to meet the needs of the Authority area. Member counties of the Lower Cape Fear Water and Sewer Authority include Bladen, Brunswick, Columbus, New Hanover, and Pender Counties. The proposed Authority project will extend regional raw water service to rural areas via the pipeline route and rural residential service will be expanded. Water for industrial use will be made available to rural areas in New Hanover and Brunswick Counties. A rural residential water supply is planned for New Hanover County through extensions from the City of Wilmington's system.

Engineering studies have identified the need for additional surface water supplies of 13.0 MGD by 1978, increasing to 33.0 MGD by 1985 and 48.0 MGD by 1990. All but a very small percentage of these additional needs will be for

rural areas. The following facilities are required to implement the water supply projects to meet the needs of the Authority area.

- (a) A 45 MGD delivery system with either 48-inch or 54-inch pipelines.
- (b) Intake and pumping station at Kings Bluff.
- *(c) A 48-inch diameter transmission main.
- *(d) A 3.0 MG control reservoir.
- *(e) A 24-inch and 12-inch line along U.S. 421, including a booster pumping station.

Sources funding the project:

- (a) EDA -- \$3,500,000
- (b) Coastal Plains Regional Commission -- \$1,000,000
- (c) N.C. Clean Water Bond Act -- \$2,782,450
- (d) Revenue Bonds purchased by the Farmers Home Administration -- \$9,234,550

Annual operating costs have been prepared and used to establish necessary water use charges. An allocation charge of \$30,000 per MGD and a user charge of \$0.09 per 1,000 gallons will produce annual revenues which exceed costs.

A schedule for design and construction of the project has been prepared. A total elapsed time of 39 months will be required to complete the project, from initiation of design activities to completion of construction.

The following recommendations were made to the Authority:

1. Approve this Engineering Report, including the recommended facilities for the 45 MGD supply system.
2. Submit this report, along with the necessary grant and loan applications and supporting data to the appropriate funding agencies.
3. Authorize design of the recommended facilities upon receipt of a CPRC Grant and other funds.

*These recommended facilities are based on the availability of funds. The estimated project cost of the recommended facilities is \$16,517,000 based on 1976 indices.

D. Wilmington Housing Assistance Plan, prepared by the Wilmington-New Hanover Planning Department, Community Development Division.

Wilmington has the potential of offering a variety of types of liveable housing environments. However, it faces severe problems which currently threaten to outweigh its resources. The positive features include both older, historically significant houses as well as recent construction, especially of multi-family luxury apartments. The problems include high incidence of substandard houses, lack of financial resources for rehabilitation, and scarcity of homes for low-income persons. As will be seen, efforts are being made to alleviate these unsatisfactory conditions.

Of the 19,289 housing units in the city, 3,227 (or 17%) have been found to be substandard. It is estimated that only 577 of the substandard units are suitable for rehabilitation. This problem affects both owner-occupied and rental properties in equal percentages, but the burden is borne particularly by home-owners, as there is only a 1% vacancy rate in owner-occupied structures, whereas rental properties have a 10% vacancy rate. The low vacancy rate indicates that persons wishing to purchase safe, decent housing may not be able to find such, even if they have financial resources to do so. It does not appear that immediate solutions will be found if the present slump in construction of new housing continues. Permits issued in 1975 indicate that there were 60 permits issued for new construction and 105 permits for demolitions, for a net loss of 45 housing units during one year. Some relief can be expected as economic conditions improve.

The housing needs of low-income persons are particularly acute. It is estimated that low-income households needing housing assistance total 3,403 families, including 1,157 elderly households. Information available from the Wilmington Housing Authority shows that they have 1,866 rental units, which at the present time are at 100% occupancy. There are also other types of

publicly subsidized housing. However, current waiting lists for public housing and other estimates show that there are still unmet needs for housing for low-income families.

Several programs are being planned to combat Wilmington's housing problems. First, \$600,000 of the City's Community Development Block Grant from HUD has been set aside for a housing rehabilitation program. Under the auspices of the Urban Reinvestment Task Force, a Neighborhood Housing Service will be established, providing assistance to homeowners desiring to bring their homes up to standard. Financial assistance in the form of loans will be available both from private lending institutions and from a "high-risk" revolving loan fund. A rehabilitation self-help program is being planned to provide training in construction skills for residents of the rehabilitation areas.

Second, the City has decided to use \$277,496 from its "Section 8" allocation from HUD to build the first of two 150-unit highrise facilities for housing the elderly. It is anticipated that a health and recreational facility will also be included in the complex. The City is also investigating other uses of Section 8 monies, such as providing rental assistance for existing or rehabilitated housing.

In addition, the City's Minimum Housing Code has been thoroughly revised, with a new emphasis on remedial rather than punitive administration. A Housing Services Counselor now works with persons whose homes have been found to be substandard, providing assistance in securing a contractor or seeking financial resources for repairs.

It is hoped that these and other efforts will enable the City to overcome some of its housing problems.

WILMINGTON-NEW HANOVER PLANNING DEPARTMENT
COMPREHENSIVE
PLANNING PROGRAM

PUBLIC PARTICIPATION
PROGRAM

MAY 1976

I. INTRODUCTION

The Coastal Area Management Act of 1974, which was passed by the North Carolina General Assembly, requires that each of the state's coastal counties develop a land use plan which "achieves responsible and needed growth within the capacity of the land and adjacent waters to sustain it". The Act also states "that the Land Use Plan of each county should reflect the desires, needs, and best interests of citizens residing within the county".

In its "Guidelines for Local Planning", the Coastal Resources Commission has stated that, in the process of formulating future land use policies, "it is important to employ effective methods to secure the view of a wide cross-section of citizens representing not only each different geographic area of the county, but those who can ably represent the varying economic, social, ethnic, and cultural interests as well". Further, in implementing this policy, the Commission requires that the final land use policies adopted by local officials contain a statement outlining the methods used to secure public participation and an assessment of the degree to which these methods have been successful.

In accordance with this requirement, the purpose of this report is to outline the organization of the Wilmington-New Hanover Public Participation Program, to describe the activities which have been undertaken as a part of this program; and to assess the overall effectiveness of the program in achieving participation.

II. FOCUS AND ORGANIZATION OF PARTICIPATION PROGRAM

The Coastal Resources Commission's publication, "Guidelines for Public Participation", provides an excellent concept of public participation in the planning process. The guidelines suggest that public participation includes two separate but related activities -- public information and public involvement. Public information programs insure that citizens understand the county's problems and the procedures involved in the planning process. Public involvement programs give citizens the opportunity to participate, with elected officials and the professional planning staff, in the formulation of land use policies.

As stated in the Commission's guidelines, in order to achieve effective and informed public participation, it is necessary to give equal emphasis to both steps on a continuing basis, for it accomplishes little to inform the citizen without encouraging him to participate in the planning process, and even less to get him involved if he is not informed.

The Public Participation Program which has been undertaken for the Wilmington-New Hanover Planning Area has given proper emphasis to both information and involvement.

A. CITIZEN INVOLVEMENT PROCESS

The fundamental goal of the Wilmington-New Hanover Public Participation Program is to obtain the effective involvement of citizens from all parts of the Planning Area and from all socio-economic groups in the formulation of public policies for the growth and development of the Planning Area. The programs which have been designed to achieve this goal are an outgrowth of the evaluation of several alternatives, ranging from neighborhood or community meetings to public hearings and questionnaires, and they are judged by the

planning staff to represent the best features of available techniques consistent with the very severe time constraints of the coastal management program. Eighteen months is a short time to build an effective participation program.

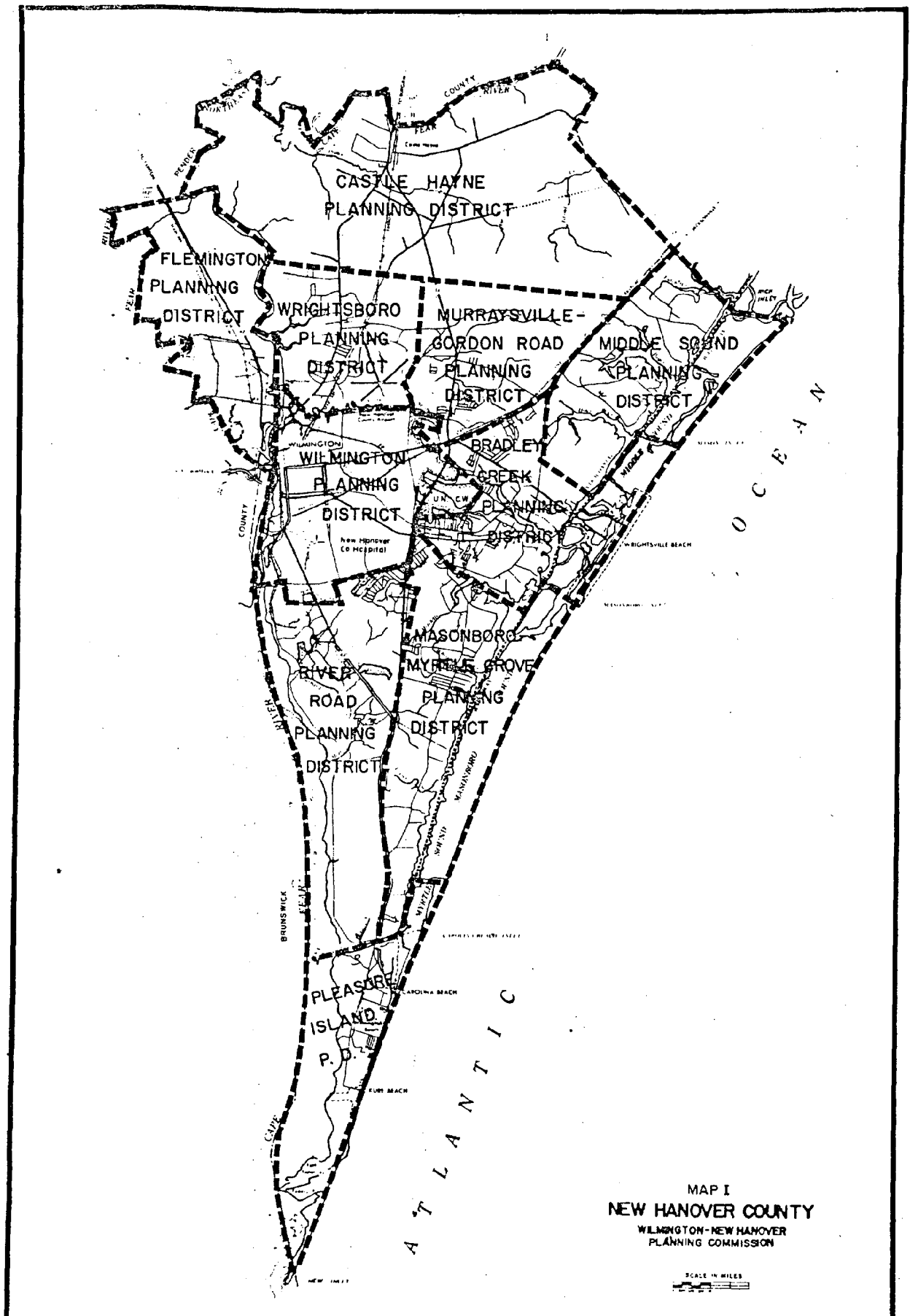
The basic concept of citizen involvement in the Planning Area is simple -- the organization of a number of citizen groups throughout the area to discuss problems and identify priority concerns, to formulate future development goals based on these concerns, and eventually to evaluate the effectiveness of development plans designed to achieve these goals. The objective of this approach is to recreate the "town meeting" atmosphere so that each resident has the opportunity to become intimately involved with elected officials and their staff in the planning process -- an opportunity not always available with more traditional techniques such as questionnaires or public hearings.

Implementation of the Citizen Involvement Process has required five major steps:

1. Subdivision of the County into ten Planning Districts to provide a basis for obtaining the desired geographic perspective on Planning Area problems and goals;
2. Selection of Coordinators in each Planning District to provide citizen leadership for the citizen involvement process;
3. Formation of Planning District Task Forces, or citizen organizations, to identify problems and to set goals;
4. Execution of Task Force activities; and
5. Synthesis of problems and goals at Planning Area level through the joint efforts of the Planning Staff and elected officials.

1. Delineation of Planning Districts

Experience seems to indicate that the most successful citizen participation programs are those based on small geographic areas where participants have a sense of "neighborliness" or commonality and are able to express ideas more



topics were discussed, including the requirements of the Coastal Area Management Act, citizen perceptions of existing community problems, and the findings of various technical planning studies prepared by the planning staff. To facilitate the actual identification of community problems and to determine which of these problems were of priority concern, a group process known as Nominal Group Technique was utilized. Nominal Group Technique is a problem identification and problem solving process which encourages each individual to generate his own list of ideas or problems; it allows each of these problems to be discussed equally and in detail by the group; and finally it allows the group to determine which of these problems should receive priority attention. This technique is considered to be particularly well-suited for the participation program which has been conducted in the Wilmington-New Hanover Planning Area. By forcing groups to focus on the task of identifying developmental problems, the technique is efficient, and efficiency is an important factor considering the time constraints of the Coastal Area Management Act. In addition the technique encourages the full participation of each member of the Planning District groups. Nominal Group Technique permits each person to put his ideas before the group, and it allows each of these ideas to receive equal attention in the process of setting priorities.

A list of the seven most important problems, or concerns, which were identified in each of the ten Planning Districts is presented in Table 1. These priority concerns are the basis for the policy objectives which have been identified for the Wilmington-New Hanover Planning Area. After the meetings using the Nominal Group Technique were completed, the priority concerns from throughout the Planning Area were utilized to develop a tentative set of objectives for future development. These tentative objectives were then discussed with the citizen groups and the Wilmington-New Hanover Planning Commission. The comments and criticisms identified in these reviews were incorporated

Table 1. PRIORITY CITIZEN PLANNING CONCERNS

A. Middle Sound

1. Runoff from septic tanks into creeks and marshes causing pollution.
2. a. Poor land drainage.
b. Lack of enforcement of zoning laws.
3. Poor soil causes septic tank problems.
4. Lack of safe and adequate water supply in area.
5. Erosion due to runoffs, tides and boats.
6. a. Overcrowding (too many people).
b. Development of unsuitable land because of cost factors.
7. Proper control of commercial development.

B. Masonboro-Myrtle Grove

1. Quantitatively and specifically identify causes of coastal water pollution, i.e. red flagging.
2. Overdevelopment of subdivisions.
3. Inform the steering committee of any changes on zoning, road construction, etc.
4. Drainage.
5. Masonboro Island.
6. a. Outer Loop.
b. Recreation.
7. Encroachment of commercial uses into residential area.

C. Flemington

1. Landfill in residential area.
2. Too much industry in district.
3. Air pollution from local industry.
4. a. Roads in Planning District are not maintained.
b. Too much noise and traffic.
c. No buffer zone between residential area and industrial area.
5. No mosquito control in the area.
6. No traffic enforcement.
7. No traffic control light.

D. River Road

1. County-wide sewage system.
2. Recreation area similar to Empie Park at Monkey Junction.
3. Establish marshes, rivers, and Masonboro Island as area of environmental concern.
4. Ditches maintained in developments. County officials irresponsible in cases of subdivision problems.
5. County needs to implement thoroughfare plan.
6. No mixture of residential densities. Too much spot zoning for mobile homes and small businesses.
7. Improve and fill unauthorized dumps. County maintain drainage ditches.

E. Bradley Creek

1. Improper drainage in developments.
2. County-wide sewage system.
3. Protected transportation arteries to Wrightsville Beach.
4. Establish areas of environmental concern, establish marshlands, rivers and Masonboro Island.
5. a. County officials irresponsible in cases of subdivision and development problems.
b. Central water system.
6. a. Lack of proper facilities for trash disposal.
b. Too much spot zoning for mobile homes and small businesses.
7. Improve and fill unauthorized dump.

F. Pleasure Island

1. a. Unsuitable land for septic tanks is being approved for development.
b. Beach erosion.
2. a. Improvement of drainage in development.
b. Pollution of waterways in Pleasure Island and Wrightsville Beach.
c. Excessive use of septic tanks.
3. a. County-wide sewage system.
b. Improper fill and unauthorized dumps.
4. Lack of proper facilities for trash disposal.
5. a. County is not maintaining drainage ditches.
b. Desecration of woodlands in buffer zone along river at Carolina Beach.

G. Murraysville-Gordon Road

1. County-wide sewage system.
2. Erosion of soil.
3. Central water system.
4. a. Improve drainage in developments.
b. County is not maintaining drainage ditches.
5. Recreation facilities.
6. Owners will not keep ditches clear in developments.
7. a. Lack of proper facilities for trash disposal.
b. Excessive use of septic tanks.

H. Castle Hayne

1. Tax incentives for farmers.
2. Drainage -- lack of stringent ordinances regulating land development; lack of enforcement of existing regulations.
3. Air pollution from industries.
4. Planned county-wide sewer system not wanted.
5. Proliferation of industries in unsuitable locations.
6. Absence of citizen participation in important public decisions.
7. Current property taxes unfair to farmer.

I. Wrightsboro

1. Lack of stringent ordinances regulating land development; existing ordinances poorly enforced.
2. Beltline or Outer Loop Highway needed but should not be routed through existing residential areas or prime agricultural areas.
3. Airport noise.
4. No county-wide parks.
5. Improper county equipment to maintain drainage ditches.
6. Proliferation of industries in unsuitable locations.
7. Excessive traffic on Highway 117.

into the tentative policy objectives, and a final set of recommendations were prepared for consideration by the Planning Area's elected officials -- the Wilmington City Council and the New Hanover County Board of Commissioners.

III. PUBLIC INFORMATION PROGRAM

Public information has been the second major aspect of the Public Participation Program in the Wilmington-New Hanover Planning Area. As stated in the Coastal Resources Commission's "Guidelines for Local Planning", citizens cannot be expected to participate effectively in the process of planning for the future if they are not aware of existing and potential local problems and are not familiar with the public planning process. Therefore, information has been a major concern throughout the Public Participation Program.

Since the Public Participation Program was initiated a number of public information meetings have been conducted in each of the Planning Districts. Where possible an attempt has been made to obtain expert speakers to address the priority problems in each Planning District. For example, Dr. Joe Phillips, an Agronomist from North Carolina State University, spoke to one group on the relationship between soils and septic tanks. Table 2 contains a list of the topics covered at the public information meetings.

In addition to the public information meetings, the planning staff has attempted to use the media as widely as possible to insure that the residents of the Planning Area are well-informed on the requirements of the Coastal Management Program and on the planning program which has been undertaken to meet these requirements. There have been a total of ten television interviews. Two of these public service television programs lasted one full hour.

There have also been a total of fifty-four short public service announcements on both radio and television, and the planning program has been reported in the local newspaper sixteen times.

Table 2. Public Information Meeting Topics

1. The Coastal Area Management Act and the New Hanover County Citizen Participation Program -- Bill Farris, Wilmington-New Hanover Planning Department.
2. Land Drainage Systems -- George Taylor, USDA Agriculture Conservation Service.
3. Pollution of Shellfish Areas -- Bob Benton, N.C. DNER Shellfish Sanitation.
4. Soils and Septic Tanks -- Dr. Joe Phillips, Agronomist North Carolina State University.
5. Countywide 201 Facilities Plan -- Col. Paul Dineson, Henry Von Oesen and Associates.
6. Widening of Carolina Beach Inlet -- David Patchell, U.S. Corps of Engineers.
7. Airport Zoning -- Harry Oakes, Wilmington-New Hanover Planning Department.
8. Countywide Recreation Plan -- Gardner Gidley, Gardner Gidley Associates Recreation Planners.
9. Southeastern Segment of the Wilmington Outer Loop -- William Pollard and Roy Freeman, Jr. of William S. Pollard Consultants, Inc. (retained by NCDOT).
10. Community Water and Sewer Systems -- Bob Williams, New Hanover County Engineer.
11. Pollution of Howe Creek and the Sound -- Tyndell Lewis, N.C. Department of Natural and Economic Resources.
12. Spot Zoning and Development -- Bill Farris, Wilmington-New Hanover Planning Department.
13. Population and Economic Study of New Hanover County -- Ron Brown and Bill Farris, Wilmington-New Hanover Planning Department.
14. Pros and Cons of a Sanitary Land Fill -- Rick Shiver, N.C. Department of Natural and Economic Resources.

IV. SUMMARY

Since the initiation of the Wilmington-New Hanover Public Participation Program in the late spring of 1975, over sixty meetings have been held to discuss community problems and the plans which have been designed to solve these problems. At these meetings almost 1900 area residents have become involved in the coastal planning process. The Planning Department currently maintains a mailing list of 1900 residents, and regularly sends each of these residents a newsletter which summarizes planning progress, and which informs them of evolving problems such as rezoning requests.

Numbers of meetings and numbers of people attending meetings are not a good measure of the effectiveness of a Public Participation Program. The measure of effectiveness actually lies in the successful implementation of the plans which evolve from the process and ultimately the effectiveness of those plans in achieving the goals toward which they are directed. However, it is the opinion of the planning staff that the Public Participation Program which has been undertaken in the Wilmington-New Hanover Planning Area has been effective. A substantial number of area residents are familiar with the major problems which will confront this community over the next twenty-five years and they are also familiar with the plans which have been developed to deal with those problems. In addition the planning staff has gained an invaluable understanding of the values, the aspirations, and the major concerns of its clients -- the residents of the Wilmington-New Hanover Planning Area. All of these are essential ingredients in an effective planning program.

WILMINGTON-NEW HANOVER
COMPREHENSIVE
PLANNING PROGRAM

RECOMMENDED POLICIES FOR
GROWTH AND DEVELOPMENT

DRAFT

APRIL 29, 1976

AMENDMENTS

The following is a description of the Planning Commission's recommended changes resulting from review and discussion of the recommended policies:

Section II, A. (3) (c) - Pg. 9: Change "shall" to "should."

Section II, A. (3) (f) - Pg. 10: Change "shall" to "should."

Section II, B. (1) (a) - Pg. 11: Insert "seafood" at end of sentence.

Section II, B. (1) (c) - Pg. 13: Insert "appropriate site improvements are made or" between "as" and "centralized." Also, revise last sentence to read "Where septic tanks are permissible, no part of the system shall be any closer than 100 feet to estuarine waters and drainageways which discharge to estuarine waters."

Section II, B. (2) (a) - Pg. 14: Strike "...the county's poor soils" and insert "those soils of the county which are unsuitable for waste disposal."

Same Section, last paragraph: Change "impacted" to "affected."

Section II, B. (2) (c) - Pg. 15: First policy statement - change "prohibited" to "restricted."

Section II, B. (3) (c) - Pg. 16: Add at end of second policy statement "or other uses which would not have the effect of damaging or altering the natural function of the marsh."

Section II, B. (4) (c) - Pg. 17: Strike out all of policy recommendation No. 2 and replace with "Based on an analysis of the Planning Area's future local and export mineral resource needs, prime resource sites should be identified and protected from incompatible development."

Same Section, last policy recommendation: Replace "impacts" with "effects on surrounding areas."

Section II, B. (5) (a) - Pg. 17: In finding No. 2 change "an extreme" to "a significant."

Same Section, Finding No. 2 - Pg. 18: Change "can" to "may" and strike "easily."

Same Section, last paragraph - Pg. 18: Change "threat" to "danger." Also, after "The New Hanover County Airport" add "and its approach patterns over populated areas."

Section II, B. (5) (c) - Pg. 19: In first policy recommendation strike "no" and change "permitted" to "discouraged."

Section II, C. (2) - Pg. 21: Change "insure" to "encourage."

Section II, C. (3) - Pg. 21: In second policy recommendation put a period (.) after "avoided." Also, strike "and" and begin new sentence with "The development of ...". Also, put comma (,) after "parks."

Same Section - Pg. 22: Change policy recommendation No. 10 to read "Housing market information will be provided to the real estate industry to assist in meeting consumers' housing needs, both numbers and types."

Section II, D. (3) - Pg. 23: In policy recommendation No. 3 strike "Outer Loop"; add "or route" between "highway" and "shall"; and change "minimal negative impact" to "least adverse effect." In policy recommendation No. 5 put "In the future design of thoroughfares," at the beginning.

Section II, E. (1) - Pg. 24: In finding No. 5 strike the quotation marks; Strike "There is no" at beginning and begin new sentence with "Public"; and, add "is inadequate" to the end.

Section II, F. (3) - Pg. 26: In third policy recommendation change "fiscal techniques" to "tax benefits."

I. INTRODUCTION

A. BACKGROUND

The past decade has brought tremendous change to the citizens of Wilmington and the surrounding areas of New Hanover County. Expanded economic development has produced more industries, more shopping facilities and more jobs. It has also attracted large number of new families and has stemmed the flow of young people out of the county in search of jobs.

Equally important has been the change in the area's landscape. New factories, new shopping centers, new apartment complexes, and new residential subdivisions have gone hand-in-hand with the area's growth. Much of this new development has taken place in formerly rural areas where the public was not prepared to service it, creating a demand for the investment of tax dollars for new services, such as water and sewer facilities, and for the expansion of existing services, such as police and fire protection. In addition, factories, stores, and residences have been built in areas where the land is not really suited for intensive development.

This decade of change has brought with it concerns on the part of many residents. These concerns are for threats to the quiet, rural life-style enjoyed by many residents; for environmental degradation resulting from unsound development practices; and perhaps most concretely, for rising tax bills which can be attributed, at least partially, to inefficient urban development.

In response to these concerns, the Wilmington-New Hanover Planning Department, a joint agency of city and county governments, began the preparation of a comprehensive plan in 1974. The basic purpose of this planning effort is to develop an effective growth management program which will permit continued expansion of the area's economy while minimizing the taxpayers'

costs for services and preventing further damage to the area's environmental resources.

Concurrent with the initiation of this planning program, the North Carolina General Assembly enacted the Coastal Area Management Act of 1974 (CAMA). This legislation requires that local governments develop land use plans in accordance with specifications adopted by the Coastal Resources Commission, the organization having overall responsibility for implementing CAMA. Therefore, the technical studies undertaken and issues addressed in the planning program have been strongly influenced by the Coastal Management legislation.

The planning program has been organized to include three phases.

Phase 1. -- Policies for Urban Growth and Development:

Addresses the basic questions of how much growth is desirable, where growth should occur, and what types of growth should be encouraged?

Phase 2. -- Detailed Land Use Recommendations: The

outcome of this phase will be specific recommendations on the location and proper interrelationships of major land uses.

Phase 3. -- Land Management Tools: Develops recommenda-

tions concerning the adoption of land management tools -- amending existing zoning ordinances and subdivision regulations, as well as new concepts.

B. PHASE 1 RECOMMENDATIONS

As stated in a growth policy report by the New Hanover County Environmental Impact Committee,

"The freedom of an individual to use his land as he wishes has traditionally been cherished as an implicit value of American life. However, as land becomes developed, individual freedoms often conflict. Protection of the private property rights of some often results in the restriction of the rights of other individuals and of the community as a whole.

There is a need for balancing private rights, the public interest and the natural capabilities of the land to set mutual goals. These goals should protect what we most value in the environmental, cultural and aesthetic characteristics of the land while meeting the essential needs of the growing population for housing, transportation, recreation, industrial facilities and businesses."

The purpose of this report is to present the Planning Staff's policy recommendations which have grown out of the technical studies and the Public Participation Program which were undertaken in Phase 1 of the planning program. Taken as a body, these recommendations define a need, suggest appropriate objectives for meeting that need, and recommend policies which are means of achieving these objectives.

Seven separate areas of policy have been addressed:

- A. Urban Growth
- B. Environmental Quality
- C. Land Use
- D. Transportation
- E. Recreation and Open Space
- F. Agriculture and Forestry
- G. Historic and Archeological Sites

These policies, when adopted by the Wilmington City Council and the New Hanover County Board of Commissioners, will provide a set of principles to guide decision-making at all levels of city and county government, whether these decisions relate to a petition for rezoning, the extension of water and sewer services, the location of a new school or some other question concerning growth and development in the Wilmington-New Hanover Planning Area.

II. POLICY RECOMMENDATIONS

A. Urban Growth

The need for a formal policy regarding growth in the Wilmington-New Hanover Planning Area has been supported both by the technical studies undertaken by the planning staff and by the concerns expressed by the area's citizens through the Public Participation Program.

The area's recent growth has brought a degree of economic prosperity to many residents. At the same time, however, the impact of this growth is a matter of concern to many citizens and public officials. Growth and its attendant problems has had a detrimental effect on the area's natural resources; it has created extreme pressure on existing city and county services, as well as escalated demands for new services; and it has produced an unwanted change in the life-style of many residents.

1. Findings

The major findings which form the basis for the planning staff's recommended growth policy stem from the results of the staff's technical reports and the Planning Area's Public Participation Program.

a. Population Growth

Recent growth trends are expected to continue. Increasing from a current level of approximately 94,000, the county's population will range between 123,000 and 151,000 by the year 2000. The most current information available indicates that the projected population level of 151,000 is most probable.

As in the recent past, it is expected that the bulk of this growth will take place in the suburban and rural parts of the Planning Area where services are poorly developed.

b. Income

As measured by median income, the economic well-being of all Planning Area residents has improved significantly in recent years; however, there remains a gap between the incomes of local residents and the incomes of other prosperous urban areas of North Carolina.

In spite of the Planning Area's economic gains, there also remains a substantial number of families which are economically disadvantaged. These poor families are predominantly black, city residents, and a large percentage (45 percent) have female heads.

Studies of the local economy have shown that rising incomes are closely paralleled by an increase in the number of people employed in the manufacture of durable goods. Durables employment is generally characterized by higher technical skill requirements, higher productivity, and higher wages.

Expansion in the number of jobs requiring high technical skills tends to have a significant positive impact throughout the economy by introducing a degree of upward mobility into the workforce. Semi-skilled workers can move into higher paying skilled jobs, and the unemployed and under-employed can fill the jobs vacated by the semi-skilled. Such a process, however, requires an open job market and innovations in vocational education programs.

A study of the area's economy indicates that the five economic sectors with the greatest impact on income at present are:

- 1) chemicals
- 2) trade
- 3) transportation, communication, and utilities
- 4) metals
- 5) apparel

These sectors should receive prime consideration in the Planning Area's economic development program.

c. Land Requirements

A significant amount of land will be required to meet the needs of the Planning Area's projected growth. It is estimated that, at the highest growth rate, 30 square miles of land will be required for residential, commercial, and industrial uses alone. This estimate is expanded to allow for adequate choice and flexibility in site selection.

However, this land requirement can be accommodated on environmentally suited land. Final estimates indicate that approximately 52 square miles of vacant land are suited for development (with proper improvements). Approximately 58 percent of this reserve would be consumed by the "high" population projection, indicating that, even with a high growth rate, environmentally unsuited lands need not be developed.

d. Urban Sprawl

Experience in New Hanover County, as well as other areas, indicates that, if left entirely to the direction of the free market, development would occur in a widely scattered, haphazard pattern.

Urban sprawl is costly to the taxpayers. An analysis of growth alternatives for the Wilmington-New Hanover Planning Area indicates that the costs of providing basic services to a sprawling development pattern may be more than two-times greater than to a compact development pattern.

In some cases, sprawling development patterns may render the provision of needed services economically infeasible because overall development densities are too low.

e. Sewerage Services

Engineering studies indicate that a centralized system for collecting, treating, and disposing of sewage is essential to alleviate existing septic tank problems and to prevent sewage problems generated by future development.

It is estimated that there remains a maximum of 11,000 acres of undeveloped land which is suited for septic tanks within the Planning Area. As a result of the existing proliferation of septic tanks in unsuited soils, 19 residential subdivisions currently experience septic tank problems.

Centralized sewerage facilities are expensive and normally they cannot be financed without federal and state assistance. Combined federal/state aid can be as much as 87.5 percent of eligible sewerage costs, but only if guidelines are met. The most relevant guidelines from the standpoint of growth policy are the following:

- 1) Projects must be the most cost-effective alternative for meeting water quality goals;
- 2) Projects must be energy-efficient; and,
- 3) Projects must be environmentally sound.

These guidelines favor a compact development pattern, where practical.

f. Loss of Farmland

The loss of prime agriculture land to development is an important concern in the Planning Area. Even though full-time employment in agriculture has declined for the past several years, it still represents a significant source of part-time employment for area residents. In addition, through the Public Participation Program, area residents have expressed a strong desire to preserve agriculture as a way-of-life in New Hanover County.

g. Capitalize on Existing Investments

The multi-million dollar investments of New Hanover County and its municipalities in public improvements and of the private sector in existing buildings and other facilities are most readily optimized by encouraging compact development around existing developed areas.

2. Policy Objectives

Based on these findings, the following policy objectives have been defined for urban growth in the Wilmington-New Hanover Planning area:

- 1) To increase the accessibility of all Planning Area residents to the basic economic goods and services--food, clothing, decent housing, health care, and recreation--as indicated by rising median incomes among all groups of the population.
- 2) To enable the City of Wilmington and New Hanover County to deliver necessary basic urban services to urban development in the most cost-effective manner.
- 3) To enable local governments and private interests to capitalize on existing investments in buildings and other facilities in the extension of services to presently unserved areas.
- 4) To reduce any existing or potential tax inequities by insuring that taxes are proportional to the cost of services consumed.
- 5) To improve the Planning Area's long term energy efficiency particularly as it relates to service delivery and transportation.
- 6) To improve the efficiency of land utilization and thereby reduce the development pressure on prime agricultural lands and environmentally sensitive areas.
- 7) To reduce the uncertainty of the real estate market as it relates to the provision of public services and thereby to lend greater security to the long-term investments of property owners.

3. Recommended Policies

a. Quantity

Three major considerations shall be used as guidelines for decisions which have the effect of altering the Planning Area's rate of growth:

- 1) the impact of growth on the economic well-being of the Planning Area's residents;
- 2) the financial capability of local government to provide services to new residents; and,

- 3) the impact of growth on the Planning Area's quality of life.

b. Quality

In order to insure that the residents of the Wilmington-New Hanover Planning Area receive the greatest benefits from economic expansion, economic development programs shall be encouraged to give priority to industries and establishments which have the effect of diversifying the local economy, which require a more highly skilled labor force, and which have the overall effect of increasing the area's median income.

c. Distribution

Future urban development (consisting of all residential subdivisions having a density of two (2) dwelling units per acre or greater, commercial establishments having a net usable area of 5,000 square feet or more, and industries employing more than 25 workers) shall be contained within the geographical limits of a defined, but flexible, Urban Services Area. The purpose of the Urban Services Area is to encourage a compact development pattern and to permit delivery of basic urban services--sewerage, water facilities, and police and fire protection--efficiently and effectively.

d. Factors of Urban Services Area Delineation

In drawing the initial boundaries of the Urban Services Area, the following factors shall be considered:

- 1) projected land use needs (10 years);
- 2) the location and supply of land which is environmentally suited for development;
- 3) a long-range service delivery plan (12 years) which specifies expected service needs, expected service costs, and the approximate revenues which will be available to fund public services;

- 4) the need for cooperation with governments outside the Planning Area in meeting mutual service needs; and,
- 5) existing critical needs related to the health and/or safety of Planning Area residents.

e. Initial Priority of Service Delivery

In the development of new services and the expansion of existing services, areas which are currently developed at urban densities but not serviced shall receive priority.

f. Land Use Plan Outside Urban Services Boundaries

In the development of detailed land use plans, the area outside the urban services boundary shall be maintained by low-density residential areas, rural communities, open space lands, farms, and other uses compatible with the intent of the urban growth policy.

g. Expansion of Urban Services Boundary

When there is a demonstrated need and a positive cost-revenue ratio can be shown, the boundary of the Urban Services Area shall be expanded, using the same criteria as outlined above. In any case the extent of the Urban Services Area shall be reviewed at least once every five years. When the boundary is extended, land use plans for the expansion area shall be revised.

h. Urban Development Outside Urban Services Boundaries

Urban level development shall be permitted outside the Urban Services Boundary only in such cases where the developer agrees to reimburse local governments for the full cost of extending basic services or the developer agrees to provide services in compliance with standards set by local governments.

i. Real Property Appraisal

As provided for in the North Carolina Machinery Act, the differing

development potentials of land lying within and outside the Urban Services Area shall be fairly reflected in the property appraisal for tax purposes.

B. ENVIRONMENTAL QUALITY

1. Surface Water Quality

a. Findings

Surface water is, perhaps, the Wilmington-New Hanover Planning Area's most important natural resource.

Under North Carolina General Statute 113-229(n)(2), virtually all of the waters of New Hanover County are classified as estuarine waters. Estuaries are highly productive natural environments, having value for almost everyone. Some of the values are reflected simply in the richness of the life-style enjoyed by residents of the Planning Area. Estuarine waters are a major aesthetic attraction and a recreational outlet for large numbers of residents. The estuary's value is also reflected in the market place. Species which are dependent upon the estuary during part or all of their life cycle--menhaden, shrimp, flounder, oysters, and crabs--makeup over 90 percent of the total value of North Carolina's commercial catch.

Thus, maintenance of these estuarine waters in the best possible condition is essential for protecting the value of the area's residents; yet according to information contained in a draft of the Greater Wilmington 201 Facilities Plan, the water quality picture in all of New Hanover County is rather poor. The North Carolina Division of Environmental Management considers the following stream segments to be below desirable water quality standards:

- 1) Smiths Creek from Burnt Mill Creek to the Northeast Cape Fear River;
- 2) The Mouth of Bradley Creek; and,
- 3) The sound waters in the vicinity of Wrightsville Beach.

From the standpoint of shellfishing where standards are more stringent, the water quality problem is more extensive. According to the North Carolina Shellfish Sanitation Program, most of the creeks in the eastern segment of New Hanover County, most of the sound waters in and around Wrightsville Beach, a large portion of Myrtle Grove Sound, Snows Cut, and the lower Cape Fear River Estuary are closed to shellfishing.

The Planning Area's water quality problems can be attributed to several sources--the discharges from municipal waste treatment plants, the discharges from private waste treatment plants, industrial discharges, urban runoff, agricultural runoff, and malfunctioning septic tanks.

b. Policy Objective

Based on these findings, the following policy objective has been defined for surface water quality in the Wilmington-New Hanover Planning Area:

Preserve and enhance the quality of the Planning Area's surface waters to increase and perpetuate their value--biological, economic, recreational, and aesthetic--to the residents of the area.

c. Recommended Policies

The following policies are recommended in order to achieve the objectives concerning the preservation and enhancement of the quality of the Planning Area's surface waters:

- 1) The quality and quantity of runoff from urban development and agricultural activities entering the estuarine waters of the Planning Area shall be as near to a natural condition as possible.
To this end:
 - a) The system of land drainage shall be maintained as near to natural patterns as possible;
 - b) During the site development process, the maximum possible amount of suitable vegetation shall be maintained intact;

- c) A suitable natural or vegetated buffer shall be maintained between drainage ways and development activities, unless it is clearly demonstrated to be infeasible; and,
 - d) Evaluate the implementation of the New Hanover County Soil Erosion and Sedimentation Control Ordinance to insure that its objectives are being met.
- 2) Where soil conditions require lowering of the water table to permit development, it must be clearly shown that the artificial land drainage will not seriously affect the quality and salinity of estuarine waters.
 - 3) In the development of centralized sewage collection and treatment facilities, priority will be given to those areas experiencing chronic septic tank failures, areas where septic tanks have been placed in unsuited soils, and to developments currently discharging sewage effluent into the marshes and estuaries in the eastern and southern portions of the Planning Area.
 - 4) To upgrade the quality of the surface waters of the Planning Area every feasible action will be taken to improve the quality of existing municipal sewage discharges and where possible to eliminate these discharges.
 - 5) No new sewage discharges shall be permitted in the marshes and estuaries of the eastern and southern portions of the Planning Area.
 - 6) Urban type development in areas where septic tanks are expected to malfunction will be prohibited until such times as centralized sewer services are available. Where septic tanks are permissible, no part of the system shall be any closer than 100 feet from drainage-ways, streams, ponds, and estuarine waters.

2. Ground Water Quality

a. Findings

A majority of families and a significant number of industries in New Hanover County are presently dependent upon ground water. Outside of the City of Wilmington, all water whether from individual wells or private systems, comes from groundwater.

While the quantity of groundwater is at this time adequate, in many instances it is not of the best quality and generally presents problems for use as a domestic supply because of iron, hardness, corrosiveness, or chloride content. In addition, there is the potential for salt water intrusion due to the increased pumping demands of a growing population.

These existing and potential ground water quality problems are complicated by the county's poor soils and the urbanization currently taking place in the unincorporated areas. More people bring more septic tanks, and the proliferation of septic tanks increase the threat of ground water pollution in many areas.

Engineering studies have concluded that a county-wide water treatment and distribution system is needed to meet the needs of the Planning Area's projected growth; however, such a system is only in the early planning stages, and its implementation is a number of years away. In the interim, the county's ground water supply must be carefully managed to insure adequate quality and quantity.

Ground water supplies are replenished from several sources; however, from the standpoint of local ground water management, aquifer recharge areas are the most important sources of replenishment. Precipitation and surface water move into the ground water supply in these areas. The rate of recharge as well as the quality of water entering the underground supply is substantially impacted by the type of development and land uses permitted in major aquifer recharge areas.

b. Policy Objective

Based on these findings, the following policy objective has been defined for ground water quality in the Wilmington-New Hanover Planning Area:

To insure the long-term maintenance and improvement of the quantity and quality of the Planning Area's ground water supply.

c. Recommended Policies

In order to achieve the objective of long-term maintenance and improvement of the Planning Area's ground water supply the following policies are recommended:

- 1) The further use of septic tanks for sewage disposal in the Planning Area's primary aquifer recharge areas will be prohibited, unless it is clearly demonstrated that the use of septic systems will not lower the quality of ground water resources.
- 2) The introduction of untreated industrial wastes into the ground water shall be prohibited.
- 3) In primary recharge areas, developers shall be encouraged to minimize impervious surface areas to permit maximum infiltration and ground water recharge.
- 4) Where artificial drainage to lower the water table is required to permit development such drainage shall not have a significant impact on the ground water supply.

3. Wetlands

a. Findings

The wetlands of New Hanover County consist of low salt marsh, high salt marsh, brackish marsh, and riverine wooded swamps. These are the most productive of the county's natural resources, performing several vital functions, including the following: regulation of the quality and quantity of runoff water entering the estuary; provision of a vital habitat for wildlife and waterfowl; provision of the basic nutrients for the estuarine food web (90 percent of the total North Carolina commercial catch are estuarine dependent species); and provision of an aesthetic attraction.

b. Policy Objective

Based on the findings of the environmental analysis the following objective has been defined for the Planning Area's wetlands:

To preserve and manage the Planning Area's wetlands in order to safeguard and perpetuate their biological, economic, and aesthetic values.

c. Recommended Policies

In order to achieve the objective of preservation and management of the Planning Area's wetlands the following policies are recommended:

- 1) No development or activity will be permitted in an area of low tidal marsh which would have the effect of damaging or altering the natural function of the marsh.
- 2) High salt marshes, brackish marshes, and riverine wooded swamps will be developed only for uses which require water access.
- 3) The vital functions of the high marshes, brackish marshes, and riverine wooded swamps must be accommodated in the site planning process for all permitted uses.

4. Mineral Resources

a. Findings

New Hanover County contains two important mineral resources--sand and limestone. According to the latest employment statistics, industrial activities based on these resources employed approximately 290 workers in 1974. In addition, in 1973 mineral production in the county was about 12 percent of the state's total.

b. Policy Objective

Based on the findings of the environmental analysis the following objective has been defined regarding the Planning Area's mineral resources:

To recognize mineral deposits as non-renewable resources, to preserve sites where mineral extraction is economically feasible, and to minimize the impact of mineral extraction on other land uses.

c. Recommended Policies

In order to achieve the objective defined for the Planning Area's mineral deposits the following policies are recommended:

- 1) The cooperation of the state geologist will be sought to develop a more complete study of New Hanover County's sub-surface geology and to specifically identify prime mineral resource sites.
- 2) A cost-benefit analysis will be undertaken for each of these sites to determine if the benefits of mineral extraction outweigh the cost of the extractive industry's impact.
- 3) Where extractive activities are permitted land reclamation will be required.
- 4) Noise and dust, surface water pollution, and waste materials and spoils disposal must be controlled to minimize adverse impacts.

5. Development on Upland Areas

a. Findings

The upland areas of New Hanover County present both opportunities and limitations for urban development. A study by the Wilmington-New Hanover Planning Department reveals four major elements of the natural environment having an impact on the suitability of the land for development. These four elements are described as follows:

- 1) Flood hazard areas. Flood waters represent a hazard to life and property when development takes place in flood prone areas; in addition, flood plain development may actually increase the severity of flooding by acting as a partial dam and by decreasing the absorptive capacity of the flood plain soils.
- 2) Ocean beach and frontal dune system. Because they are subjected to flooding by diurnal tides and storm surges, the ocean beaches present an extreme hazard to life and property. The frontal dune system lying immediately landward of the ocean beaches constitutes the barrier island's major defense against storms. The vegetation on the frontal dunes is essential for their continued

existence. This vegetation can be easily destroyed by development, thereby reducing the island's defenses.

- 3) Water table conditions. High water table conditions increase development costs; if uncorrected may render yards and recreation areas unusable; and extensive artificial drainage to lower the water table may reduce recharge of aquifers and seriously affect the quality and salinity of estuarine waters.
- 4) Load supporting capability. The load supporting value of soils is an important variable in most types of development. Failure to insure that subsoil conditions afford a suitable load-bearing capacity for a particular building, highway, or other structure can have serious consequences--foundation collapse, differential settling, rapid deterioration of roads, and perhaps damage to adjacent properties during the construction process.

In addition, man-made hazards have been identified as having limitations for development. Like some natural phenomena certain types of development, such as airports and tank farms, have characteristics which constitute a threat to life and property in the surrounding areas. Some of the major hazard areas are:

- 1) The New Hanover County Airport
- 2) The bulk storage petroleum areas
- 3) The North Carolina State Port
- 4) The Sunny Point Ocean Terminal buffer zone area
- 5) The Love Grove industrial area.

b. Policy Objectives

Based on these findings the following objectives have been defined regarding development on the Wilmington-New Hanover Planning Area's upland areas:

- 1) To minimize the impact of urban development on the Planning Area's natural and man-made environment.
- 2) To minimize the risk to life and property from natural and man-made hazards.

c. Recommended Policies

In order to achieve the objectives defined for development on the Planning Area's upland areas the following policies are recommended:

- 1) All permanent development within the 100 year flood plain shall be carefully controlled, and no land uses except those unharmed by flooding or those inseparable from the flood plain will be permitted within the 50 year flood plain.
- 2) With the exception of those uses which must be located there, all permanent development in the dynamic ocean beach-frontal dune area shall be prohibited. Where development must take place in this area, sound engineering practices must be applied to minimize hazards from wind and water and to minimize construction damage to the frontal dune.
- 3) Intensive development on wet soils will be discouraged; where wet soils are difficult or impossible to drain, urban-type development will be prohibited.
- 4) Lowering the water table by artificial land drainage must not seriously affect the recharge of aquifers or the quality and salinity of the estuarine waters.
- 5) Detailed site analysis shall be required in areas where soils are suspected of having inadequate load bearing values, and safeguards will be required where appropriate.
- 6) Man-made hazards shall be delineated and precautions will be taken to insure that development within these zones is compatible with the associated dangers.

C. LAND USE

1. Findings

A survey and analysis of existing land use in the Wilmington-New Hanover Planning Area has revealed several key issues which must be addressed in the development policies adopted by local government. These issues include the following:

- 1) The encroachment of incompatible land uses. The encroachment of incompatible uses into residential, commercial, and industrial areas tends to reduce property values, reduce maintenance, and to eventually result in property decline.
- 2) Strip commercial development. Strip commercial development is evident in several areas. Such a development pattern is undesirable because it tends to encourage land speculation and inflated land values, resulting in a large amount of unproductive land; it depreciates the value of surrounding property for less intensive uses; and it tends to increase traffic volumes, often necessitating expensive street widenings.
- 3) Over-zoning. Over-zoning tends to encourage sprawling development patterns; it diminishes the potential that the most desirable commercial and industrial sites will be developed; and it removes land from other productive uses.

Over the next twenty-five years approximately 19,000 acres of land must be developed or redeveloped to meet the growing populations needs for homes, industries, and shopping facilities. Without proper guidance this development will result in a continuation and worsening of the area's land use problems. Therefore, we need to guide future development in a manner which will promote efficient land use patterns; which will permit utilization of the area's prime sites for residential, commercial, and industrial uses; which will prevent the occurrence of incompatible land uses, and, which will protect established neighborhoods.

2. Policy Objectives

Based on these findings the following objectives have been defined concerning land use in the Wilmington-New Hanover Planning Area:

- 1) To provide adequate industrial space to meet the needs of existing and new establishments without sacrificing environmental quality.
- 2) To provide adequate commercial space in appropriate locations to insure that commercial activities can be developed in a manner that will conveniently satisfy expanding consumer needs without detracting from existing or future residential areas.

- 3) To insure the constant availability of housing to all individuals and families which satisfies their tastes, is within their economic means, and is located in a quality living environment.

3. Recommended Policies

In order to achieve the defined objectives the following land use policies are recommended:

- 1) Industrial development shall be encouraged on sites which are environmentally suited and which have unique locational advantages for industry.
- 2) Industrial development shall be located in such a manner as to minimize the threat of environmental pollution and excessive traffic congestion. To this end, over-concentration of industry in any area of the county will be avoided, and the development of industrial parks which decrease the cost of environmental protection facilities and which are more efficient land users will be encouraged.
- 3) Climatic factors will be considered in the location of industries having the potential for odors or hazardous emissions.
- 4) The proper development of four major types of commercial areas will be encouraged:
 - a) neighborhood services areas
 - b) community services areas
 - c) regional service areas
 - d) highway service areas
- 5) Unplanned commercial development along the Planning Area's streets and highways will be discouraged.
- 6) Any future commercial development which substantially increases traffic volumes on residential streets will be prohibited.
- 7) "Spot" commercial development and the general encroachment of commercial uses into residential areas will be prohibited.
- 8) Recognizing that the existing housing stock is a major housing resource, sources of funds for housing rehabilitation will be identified and investigated and assistance will be provided to low and moderate income families in obtaining funds from appropriate sources.

- 9) The feasibility of developing and implementing a minimum housing code in areas not presently enforcing such a code will be studied.
- 10) A housing market analysis will be prepared and maintained to assist the real estate industry in meeting consumers' housing needs, both numbers and types.
- 11) Residential areas shall be located in such a manner as to facilitate the delivery of required public services.

D. TRANSPORTATION

1. Findings

A cursory examination and analysis of the Planning Area's highway system indicates that, with the exception of U.S. 421, all of its major roads are carrying traffic volumes which are either at or near their design capacity. The area's thoroughfare plan indicates that major upgradings of the existing traffic network and the addition of new major facilities will be required within the next 20 years.

The alternatives to vehicular transportation in the Planning Area are seriously limited. The Wilmington Transit Authority operates a bus system with limited routes and schedules and is currently experiencing heavy losses.

There has been strong citizen opposition voiced toward some of the improvements and new facilities advocated by the Wilmington Area Thoroughfare Plan. This opposition centers on concern for damage to the Planning Area's natural and man-made resources and the damage to viable residential areas.

2. Policy Objectives

Based on these findings the following objectives have been defined regarding transportation within the Planning Area:

- 1) To develop and maintain an efficient system for movement of people and goods within and throughout the area while minimizing the impact of transportation facilities on the living environment.
- 2) To provide sufficient transportation alternatives to meet people's transportation needs.

3. Recommended Policy

. In order to achieve these objectives the following policies are recommended:

- 1) The development of coordinative plans for land, water, and air transportation will be supported.
- 2) The maintenance and improvement of the county's secondary road system will be supported.
- 3) The development of an "Outer Loop" circumferential highway shall be supported while insuring that its design and alignment will have a minimal negative impact on the county's living environment.
- 4) The integrity of all viable neighborhoods shall be considered in the thoroughfare planning and development process.
- 5) Public facilities such as schools and parks will be protected from traffic hazards.
- 6) Public access to public transportation on a county-wide basis, particularly for travel between home and employment, shall be improved.
- 7) The development of safe and efficient bikeway facilities throughout the county shall be supported.

E. RECREATION AND OPEN SPACE

1. Findings

Wilmington and New Hanover County have recently completed a joint planning program for parks, recreation, and open space.* Major findings

*Gardner Gidley and Associates, Parks and Recreation Master Plan, City of Wilmington and New Hanover County, North Carolina, March 15, 1976.

of this program are as follows:

- 1) "There are no public swimming pools in the city or the county."
- 2) "Facilities are not equitably distributed, or, in some cases, adequate to meet current needs."
- 3) "Land currently used for recreation is inadequate in size, and, in some cases, poorly located."
- 4) "Little provision has been made for relatively simple outdoor recreation for which both national and local samplings indicate a strong preference - specifically bicycling, swimming, picnicking, nature activities, and fishing."
- 5) "There is no public access to major natural areas such as the Cape Fear River, the sounds, and the ocean beaches."
- 6) "Indoor recreation facilities are inadequate."
- 7) "No major recreation activities are conducted outside the City of Wilmington, except for organized Little League programs and programs serving relatively small populations at Wrightsville Beach and Carolina Beach."

2. Policy Objectives

Based on the study's findings two objectives have been defined for recreation and open space:

- 1) To provide full opportunity for all residents of the Planning Area to make constructive use of their leisure time.
- 2) To conserve appropriate lands in a natural state to provide for passive uses, visual relief, scenic value, and to protect natural productive processes.

3. Recommended Policies

To achieve the defined objectives, the following policies are recommended:

- 1) Every feasible action will be taken to insure implementation of the Master Parks and Recreation Plan.
- 2) Support of state and federal agencies as well as private organizations will be sought to preserve

a natural area along the Northeast Cape Fear River for the purposes of passive outdoor recreation and wildlife management.

- 3) Efforts of the U.S. Army Corps of Engineers to secure a wildlife and open space corridor along the Northeast Cape Fear River in conjunction with the Wilmington Harbor Project will be supported, recognizing that this area has important natural resource values as well as being a potentially value amenity to the Wilmington urbanizing area.
- 4) As development continues in the Planning Area adequate standards of open space for active and passive uses will be maintained.
- 5) When feasible the open space system recommended for the City of Wilmington will be expanded throughout the Planning Area in order to preserve natural and cultural resources, to provide passive recreational experiences, and to shape urban growth.

F. AGRICULTURE AND FORESTRY

1. Findings

Through the Public Participation Program the citizens of New Hanover County, particularly in the more rural areas, have expressed concern over the loss of farms and woodlands to development. These areas are important to the tradition and current life-style of many residents.

The county's growth has exerted considerable development pressure on farms and woodlands. Although the decline in agriculture in New Hanover County has been related to many trends such as labor costs and capital costs, taxes have also played a significant role. Present use valuations provide some needed relief; however, it appears that a significant number of farmers do not fully understand this provision.

Urban sprawl also contributes to the loss of farms and woodlands. The movement of urban development, such as residential subdivisions, shopping facilities, and industrial activities, into prime agricultural and woodlands

tends to attract more development resulting in a significant loss of agricultural lands.

2. Policy Objective

The following objective for the Planning Area's farms and woodlands has been defined:

To encourage the maintenance of agriculture and forestry as viable industries and to capitalize on farms and woodlands as an integral part of the county's open space system.

3. Recommended Policies

To achieve this objective the following policies are recommended:

- 1) The preservation of prime farm and woodlands for continued agricultural uses will be encouraged.
- 2) Land use controls which will facilitate the preservation of prime farm and woodlands will be developed.
- 3) Available fiscal techniques which will further the objective of preservation of farms and woodlands will be identified and publicized.

G. HISTORIC AND ARCHEOLOGICAL SITES

1. Findings

The Wilmington-New Hanover Planning Area's archeological and historic resources are among its most fragile assets. These resources are an essential part of the area's tradition, its heritage, and are an invaluable element of the quality of life afforded present residents. In addition, these resources have an economic potential through tourism which is, as yet, unrealized.

Within the City of Wilmington two separate areas consisting of more than 200 block have been listed on the National Register of Historic Places and,

thereby, have been recognized as having historic and/or architectural significance. However, only 38 blocks have been afforded the special protection of "historic district zoning". Outside the city there are also a number of scattered individual buildings and sites which are recognized as having historical significance. All of the buildings are in private ownership and do not appear to be endangered. However, no protection from incompatible development has been provided to these sites.

According to an Army Corps of Engineers inventory conducted in December of 1973 there are 16 known archeological sites within New Hanover County. The exact location of these sites are considered confidential and are not normally released by the State Division of Archives and History due to potential disturbance and destruction. However, only in major projects using federal or state funds would the Divisions of Archives and History have an opportunity to review projects having a potential impact on archeological sites. This lack of coordination could be problematic as it relates to local development activities and could result in the loss of archeological sites.

2. Policy Objective

From the findings the following objective concerning the Planning Area's historic and archeological sites has been defined:

To preserve and enhance the economic and cultural value of the Planning Area's historic resources for present and future residents.

3. Recommended Policies

To achieve the objective the following policies are recommended:

- 1) A comprehensive preservation program consisting of advisory and counseling services, financial incentives, and investment as well as existing legal tools will be developed to support the preservation objective. This program will be coordinated with and supportive of area-wide development plans.

- 2) Full development of the tourism potential of the area's historic resources will be encouraged.
- 3) Existing programs designed to promote rehabilitation and preservation of deteriorated neighborhoods and structures within the National Register Area will be reviewed and monitored. Additionally, these programs will be updated, adjusted, and coordinated as the need arises.
- 4) Better coordination between local government and the North Carolina Division of Archives and History will be sought in order to prevent the inadvertent loss of valuable archeological sites.
- 5) The interdependence of the residential and commercial components of the Historic Area will be recognized and the compatibility of residential and commercial land use shall be promoted.
- 6) The role of the historically significant Central Business District in the urban environment shall be assessed, and programs will be developed and/or supported which focus on the preservation and improvement of the Central Business District as a viable downtown core.

WILMINGTON-NEW HANOVER
COMPREHENSIVE
PLANNING PROGRAM

GENERAL DEVELOPMENT GUIDE

MAY 21, 1976

GENERAL DEVELOPMENT GUIDE

Using the "Recommended Policies for Growth and Development" as a basis, a General Development Guide has been prepared to set the parameters for the development of a more detailed land use plan in Phase II of the planning process. The Development Guide is based on a land classification system which has been developed by the Coastal Resources Commission and is required for use in the coastal resources management program.

The system's five categories--developed, transition, community, rural resource, and conservation--provide a basis for identifying, very generally, where, how much, and what types of development will occur in the Planning Area. The following is a description of the intent and application of these land classes.

a. Developed

The Developed class identifies developed lands which are presently provided with essential public services. Consequently, it is distinguished from areas where significant growth and/or new service requirements will occur. Continued development and redevelopment should be encouraged to provide for the orderly growth in the area.

Developed lands are areas with a minimum gross population density of 2,000 people per square mile. At a minimum, these lands contain existing public services including water and sewer systems, educational systems, and road systems--all of which are able to support the present population and its accompanying land uses including commercial, industrial, and institutional.

Within the Wilmington-New Hanover Planning Area, all "Developed" areas are located within the City of Wilmington where a full range of services are available.

b. Transition

The Transition class identifies lands where moderate to high density growth is to be encouraged and where any such growth that is permitted by local legislation will be provided with the necessary public services. The requirement for a commitment to provide services cannot be overstated.

The area to be designated as Transition should be no greater than that required to accommodate the Planning Area's 10-year projected

population growth at a minimum gross density of 2,000 people per square mile. It is estimated that 8.0 square miles of transitional land will be required to accommodate the Planning Area's 1975-1985 population growth. In addition, the minimum services which will be required are the necessary water and sewer facilities, educational services, and roads. Consideration must be given to the cost of public services in the Transition area.

Transition areas are located in a compact pattern around the City of Wilmington in accordance with the recommended policies for urban growth. This development pattern will permit optimum efficiency in land utilization and the delivery of public services such as sewage collection and treatment, water supply, police protection, and fire protection.

c. Community

The Community class identifies existing and new clusters of low density development not requiring major public services.

The Community class includes existing clusters of one or more land uses such as a rural residential subdivision or a church, school, general store, industry, etc. This class will provide for all new rural growth when the lot size is ten acres or less. Such clusters of growth may occur in new areas, or within existing community lands.

In every case, the lot size must be large enough to safely accommodate on-site sewage disposal and where necessary water supply so that no public sewer services will be required now or in the future. As a guide for calculating the amount of land necessary to accommodate new rural community growth, a gross population density of 640 people per square mile or one person per acre should be used. Using this criterion, it is estimated an additional 5.0 square miles will be needed to accommodate the 3,075 persons expected to settle in low density clusters over the next ten years.

Four "Rural Communities" have been designated on the Land Classification Map: Castle Hayne, Ogden, Flemington, and Sea Breeze.

d. Conservation

The Conservation class identifies land which should be maintained essentially in its natural state and where very limited or no public services are provided. Very low development densities should be encouraged in Conservation areas.

Lands to be placed in the Conservation class are the least desirable for development because:

- 1) They are too fragile to withstand development without losing their natural value; and/or
- 2) They have severe or hazardous limitations to development; and/or
- 3) Though they are not highly fragile or hazardous, the natural resources they represent are too valuable to endanger by development.

All areas designated as Class III lands (not suited for development) in the Environmental Analysis (Technical Report #3) have been classified as Conservation.

d. Rural

The Rural class identifies lands for long-term management for productive resource utilization, and where limited public services will be provided. Development in such areas should be compatible with resource production; however, these lands constitute a future reserve for Transition land.

The Rural class includes all lands not in the Developed, Transition, Community and Conservation classes.

WILMINGTON-NEW HANOVER
COMPREHENSIVE
PLANNING PROGRAM

POTENTIAL AREAS OF ENVIRONMENTAL CONCERN

MAY 1976

AREAS OF ENVIRONMENTAL CONCERN

New Hanover County's beaches, its marshes, and its rivers, creeks and sounds, as well as the rich cultural heritage preserved in its many historic sites and old homes are all valued by the county's residents as an essential part of their lifestyle. These resources have also been given special state-wide significance by the Coastal Area Management Act of 1974. The Act instructs the Coastal Resources Commission to identify critical areas which need to be considered for protection and possible preservation in each county; and to formally designate them as "Areas of Environmental Concern." Within these "AEC's", development must be reviewed for compliance with state guidelines and local plans before it may proceed. The basic goal of this permit system is to maintain or preserve the natural functions of these areas as the land is committed to more intensive uses.

Although the Coastal Resources Commission has not completed the process of delineating AEC's, the Commission's local planning guidelines require that potential AEC's be identified and considered in the development of land use recommendations. A list has been developed to illustrate the possible occurrence of Environmental Concern in the Wilmington-New Hanover Planning Area.

<u>AEC Category</u>	<u>Appropriate Land Uses</u>
1. Low Tidal Marshes	Fishing piers, docks, or other uses which do not impair the natural functions of the marsh.
2. Other Coastal Marshland	Uses which by their nature require water access such as ports, docks, and marinas.
3. Estuarine Waters	Navigational channels, bulkheads to prevent erosion, piers, and wharfs.
4. Special Aquifer Areas -- Barrier Islands	Development which do not employ septic tank disposal systems, do not present a risk of accidental discharge or soluble contaminants, and do not increase the withdrawal of water to a rate that may cause salt water intrusion.

<u>AEC Category</u>	<u>Appropriate Land Uses</u>
5. Existing State Parks	Uses associated with the recreational-cultural-educational character of the area.
6. Complex Natural Areas	Uses which do not disturb the natural conditions of these scientifically or educationally valuable areas.
7. Historic Places	Uses which will not result in substantial irreversible damage to the historic value of the area.
8. Public Trust Areas	Navigational channels, drainage ditches, bulkheads, piers, and wharfs provided they do not violate the public trust rights.
9. Sand Dunes Along The Barrier Islands	Uses which can be safely undertaken to minimize damage from wind and water.
10. Ocean Beaches and Shorelines	Uses which do not interfere with the rightful use of the beach area or contribute to its environmental degradation.
11. Coastal Floodplains	Recreation development or other development provided it conforms with the standards of the Federal Insurance Administration.
12. Excessive Erosion Areas	Uses associated with recreational or conservational activities provided only moveable temporary structures are placed in these areas.

These AEC's are illustrated in "Technical Report #3, Environmental Analysis".

**wilmington -
new hanover
comprehensive
planning program**

technical report #1

**AN ANALYSIS OF HUMAN
AND
ECONOMIC RESOURCES**

**part i: human resources
part ii: economic resources**

APRIL, 1976

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Part 1. Human Resources

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SUMMARY OF TRENDS AND POPULATION FORECASTS

Population Growth Trends

1. Since 1950 New Hanover County has been growing faster than the state; but more importantly, the county's share of the total state population has been increasing. For the 1950-1960 decade, the growth for the state was approximately 12 percent, while the county experienced an increase of nearly 13.5 percent. During the 1960-1970 decade, while the state's percentage increase fell to approximately 11.5 percent, the county had an increase of 15.5 percent. Also, for the 1950-1970 period, the county's share of total state population increased by approximately 5 percent.
2. Over the past two decades considered in this analysis, New Hanover County has been a growth center for Southeastern North Carolina. During that period Region "O's" population increased by approximately 14 percent, due strictly to natural increase. At the same time, the county's population grew at more than twice that rate--31 percent for the twenty year period.
3. Although New Hanover County is experiencing rapid growth, there are significant differentials in the growth of subareas of the county.
 - (A) During the last twenty years, the "rural"^a areas of the county have grown at a much faster rate than the city. Between 1950 and 1970 the city grew by 2.5 percent (including a major annexation), while the population of "rural" New Hanover County increased by more than 100 percent.
 - (B) The "rural" population is concentrated in Harnett Township, which contained 21 percent of the total county population in 1970.
 - (C) Although they are relatively small in population, Cape Fear and Federal Point townships' share of total population increased rapidly over the past ten years. The two townships' share of county population increased by 37 and 38 percent, respectively.
4. Migration is the major factor producing the county's recent growth. Between 1950 and 1960, the county experienced an out-migration of 4.1 percent. Between 1960 and 1970, however, this trend reversed, and the county experienced a net in-migration of 5.4 percent.

^a

Rural as used here refers to those areas outside Wilmington's corporate limits, including small incorporated areas.

5. Based on available data on births and deaths and on migration rates derived from school enrollment information, the county's 1975 population is estimated to be approximately 92,000. This represents an increase of over 8 percent since 1970 and a 1970-1980 decennial growth rate of 21 percent.

Population Composition

1. New Hanover County has an unusually large female population and, as a group, the county's females are economically worse-off than the rest of the population. For example, almost 14 percent of the county's families have female heads, and while the mean income for all county families is \$9,368, the mean income for families with female heads is \$4,289, or less than half that amount. The concentration of females is found primarily within the nonwhite population residing within the city.
2. The median age for New Hanover County dropped from 28.6 in 1960 to 27.8 in 1970. There were also comparable decreases in the median ages for each race and sex category. This lowering of the population's median age is a reversal of the out-migration trends experienced during the 1950's and early 1960's.
3. The birth rate for the past ten years has been cyclical with a low in 1966 and a peak in 1970. There is a downward trend in birth rate at present, and this downward trend is reflected in a decreasing percentage of persons in the 0-4 age group. It appears that in-migration is accounting for the absolute increases in this group.
4. Discounting the effects of inflation, total planning area incomes showed significant increases between 1960 and 1970. Between 1960 and 1970, the total county median family income increased from \$4,887 to \$7,114 in the constant 1967 dollars. This increase can be attributed to changes in the area's employment characteristics.
5. According to income statistics, "rural" families are economically better off than city families in New Hanover County. In 1970 the income of a typical city family was \$6,986, while that of a rural family was \$8,547.
6. In both 1960 and 1970, the city contained a high concentration of families in the low income range.
7. Among the major population groups in the planning area, the urban non-white population is in the worst economic position, with an extremely large concentration of families in the low-income range.
8. Household size has been decreasing, and is expected to continue to decrease in the near future. The average household size in 1970 was 3.08, and an average household size of 2.9 persons is projected for 1980.
9. The number and relative percentage of older persons in the county has been increasing and this trend is expected to continue in the near future.

Population Projections

1. Projections have been prepared for the period 1980 to 2000. All of the projections employ assumptions concerning the components of population change, that is; birth, deaths, and net migration.
2. The low and middle projections of the range are based on historical trends in the variables. The highest projection of the range is based on the current birth rate and a forecasted migration developed from 1970-1974 school enrollment data.
3. Projections

<u>Year</u>	<u>Low</u>	<u>Middle</u>	<u>High</u>
1980	94038	97546	101317
1990	107613	116740	124608
2000	122829	140283	151147

INTRODUCTION

OBJECTIVES AND ORGANIZATION

Considerations of the size, characteristics, and distribution of New Hanover County's population are at the base of most decisions affecting future development. Therefore, the description and analysis of the county's population is a fundamental element in the Comprehensive Planning Program. Population projections assist in estimating future levels of demand for land for various uses and for community services and facilities. Studies of population composition -- factors such as income, age, and race -- provide information of a more qualitative nature which is useful in the description of important social and economic trends; in the definition of problems to be addressed by the planning program; and, in identifying human resources which can be utilized in solving these problems.

A concentrated effort has been made to define the population information needs of the Comprehensive Planning Program and to develop statistics and meaningful analyses to meet these needs. As a result, four primary objectives have been identified for this study:

1. Definition and interpretation of the recent population growth trends of the planning area, giving particular attention to the factors producing these trends and to their implications for future population levels;
2. Identification of indicators of the planning area's social needs as they relate to the Comprehensive Planning Program;
3. Identification of major socio-economic differences between residents of various communities within the planning area; and
4. Preparation of reliable projections of the size and characteristics of the planning area's future population.

Within the context of these objectives, this report has been divided into three parts. The first part deals with the planning area's population growth -- current size, growth trends, growth components, and comparisons with other jurisdictions. The second part of the report consists of an analysis of the county's population composition and its implications for the Comprehensive Planning Program. The final part provides projections of the planning area's future population.

The most widely used source of statistics for population analysis is the U.S. Census Bureau, and the present study relies heavily on this data source. However, utilizing census data does present problems. The 1970 census is now almost five years old, and the data collected at that time do not adequately describe some of the more recent trends associated with the planning area's rapid growth. To minimize this shortcoming, secondary data sources have been used where appropriate to "up-date" the census data.

I. GROWTH TREND ANALYSIS

Analysis of growth trends is one of the most basic elements in the comprehensive evaluation of the planning area's population. Growth trend information serves four important functions in the planning process:

1. Growth trends are an indicator of the pressure on the planning area's land resources and its community services and facilities.
2. County growth trends can pinpoint significant changes in the structure of the area's economy.
3. Analysis and comparison of the growth trends of various areas of the county permits identification of growth differentials. All areas of a county seldom experience uniform growth rates, presenting different problems of growth management.
4. Analysis of historic growth trends provides a basis for making forecasts of the planning area's future population levels.

While the county boundaries do not conform precisely to the department's formal area of planning responsibility, New Hanover County has been used as the basic unit of analysis in evaluating growth trends; however, further comparisons are made with the growth of other jurisdictions (the state and the region) and with subdivisions of the county (townships, urban and rural areas).

A. COUNTY GROWTH TRENDS

In describing and analyzing the population growth history of New Hanover County, it is first important to understand that populations grow in much the same way that money grows when interest is compounded. Just as the interest dollars themselves earn interest, so people added to the county's population produce more people. In this sense, county growth trends are geometric rather than arithmetic, and although the determination of average annual geometric growth rates requires more extensive calculations, they more closely approximate the actual growth trend of the population.^a Therefore, geometric growth rates have been used to analyze the county's population increases.

New Hanover County's recent growth history, both in terms of absolute increases and annual growth rates, is summarized in Table 1. Between the 1930 and the 1970 censuses, the county's population increased by nearly 100 percent, from approximately 43,000 to 83,000. During this period,

^aAverage annual geometric growth rates are derived using the compound interest formula:

$$P_n = P_o (1 + r)^n,$$

Where P_o is the initial population, P_n is the population at the end of the time period, n is the time period, and r is the average annual rate of change.

however, the population increase has not been consistent. In the 1930's the county experienced an average annual growth of 1.1 percent, but as a result of the county's rapid industrial expansion during the war years, the growth rate surged to 2.8 percent during the 1940-50 period. The censuses of 1960 and 1970 have shown that, although the county's rate of growth is much slower, its population is increasing and that it is growing at an increasing rate -- 1.3 and 1.5 percent per year respectively during the 1950's and the 1960's. This forty year growth trend is illustrated in Figure 1.

One of the best ways to assess the significance of the county's population growth rates is to relate them to the number of years required for the population to double at a given growth rate. With an annual growth of 1.1 percent which the county experienced during the 1930's, it would require approximately sixty-three years for the population to double; however, at the 1960's growth rate of 1.5 percent, it would require only forty-six years for the county's population to double.

TABLE 1

NEW HANOVER COUNTY POPULATION GROWTH CHARACTERISTICS
FOR SELECTED YEARS BETWEEN 1930 AND 1970^a

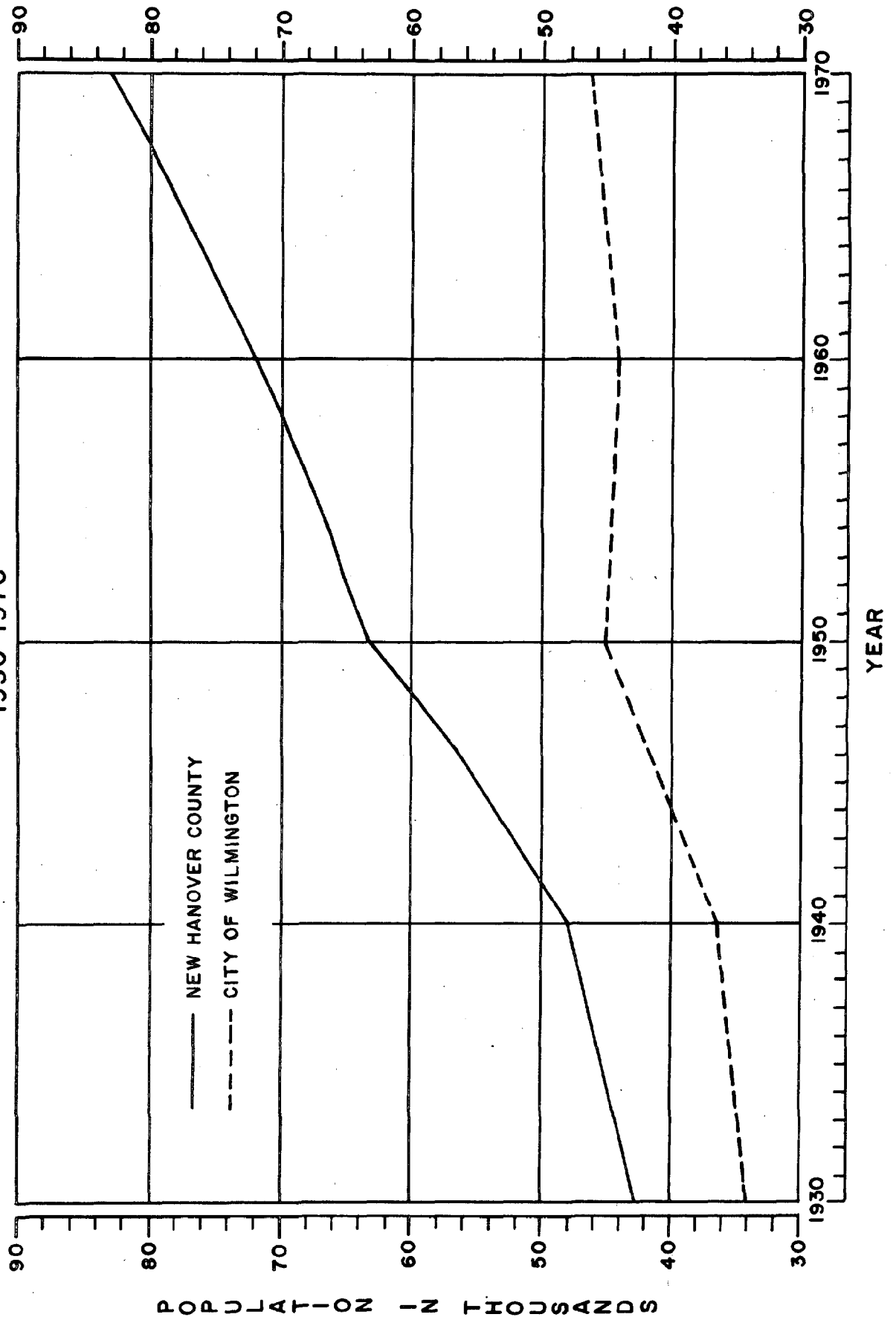
<u>County Population</u> ^b	
1930	43,010
1940	47,935
1950	63,272
1960	71,742
1970	82,996
<u>Absolute Increase</u>	
1930-40	4,925
1940-50	15,337
1950-60	8,470
1960-70	11,254
<u>Average Annual Growth Rate</u>	
1930-40	1.1 percent
1940-50	2.8 percent
1950-60	1.3 percent
1960-70	1.5 percent

^a U.S. Census of Population; Wilmington-New Hanover Planning Department.

^b Estimates of current population are found in a separate section of this report.

FIGURE 1

POPULATION GROWTH TRENDS
NEW HANOVER COUNTY AND CITY OF WILMINGTON
1930-1970



B. STATE AND REGIONAL COMPARISONS

As shown in Table 2, New Hanover County's average annual growth rate over the past two census periods has been slightly higher than that of the state as a whole. From 1950 to 1960, the county grew at an annual rate of 1.30 percent while the state's population increased by 1.15 percent each year. During the 1960's the difference between the two rates of growth was much greater; the state's annual growth rate declined slightly to 1.1 percent while that of the county increased to approximately 1.5 percent.

The relationship between the population increase of the county and Region "O"^a is similar. During both census periods, the growth rate of the county was much higher than that of the region. At the same time, however, the gap between the growth rates closed sharply from 1950 to 1970. During the 1950's, the county's annual growth was more than 2.5 times greater than that of the region. Between 1960 and 1970, however, the county's growth rate was slightly less than two times the region's rate of growth.

In conjunction with the higher growth rates, the county's share of regional and state population is also increasing. For example, between 1950 and 1970, New Hanover County's share of total state population increased from 1.56 percent to 1.63 percent. Similarly, the county's share of Region "O" population increased from 41.7 percent in 1950 to 48.2 percent in 1970.

New Hanover County's recent growth in population has been dramatic: its annual growth rate is increasing; it is growing faster than Region "O" or the state; and its share of regional and state population is increasing. If these trends mirror the county's future growth, then there are obvious implications for the Comprehensive Planning Program:

1. A rapidly expanding population will bring increasing pressure on county's land resources, emphasizing the need for new and improved land management programs;
2. The customary response time for bringing public services and facilities "on-line" must be greatly reduced, requiring expanding planning programs throughout the various agencies and departments of city and county governments; and
3. If the patterns of other urban areas are maintained, the expanding population will bring a demand for qualitative as well as quantitative increases in the level of public services.

^a Region "O" includes New Hanover, Pender, Brunswick, and Columbus Counties.

TABLE 2

Comparison of Population Growth Rates -- New Hanover County, Region "O", and North Carolina

Area	Population			Absolute Increase			Growth Rate	
	1950	1960	1970	50-60	60-70	50-60	60-70	
New Hanover County	63,272	71,742	82,996	8,470	11,254	1.30%	1.50%	
Region "O"	151,554	159,501	172,305	7,947	12,804	0.51%	0.78%	
North Carolina	4,061,929	4,556,155	5,082,059	494,226	525,904	1.15%	1.10%	

Source: U. S. Census of Population; Wilmington - New Hanover Planning Department

TABLE 3

New Hanover County Share of Total Population -- 1950 - 1970

Area	New Hanover County Share of Total Population		
	1950	1960	1970
North Carolina	1.56%	1.57%	1.63%
Region "O"	41.70%	45.00%	48.20%

Source: U. S. Census of Population

C. SUBAREA GROWTH TRENDS

While New Hanover County has experienced a rapid growth in population during recent years, a closer examination of subareas of the county indicates that this growth has not been uniform. As shown in Table 4, census tabulations permit analysis of subarea growth trends at two levels. First is a comparison of Wilmington and the remaining portions of the county. This may be characterized as an urban-rural comparison because, according to Census Bureau, the towns of Wrightsville Beach, Carolina Beach, and Kure Beach have populations less than 2,500 and are classified as rural. The second comparison is based on the growth differentials of the county's township subdivisions. This system of subareas is illustrated in Figure 2.

Comparison of urban and rural growth characteristics found in Table 4 reveals a rapid suburbanization process occurring in New Hanover County. In 1950, almost three-fourths of the county's population resided within the City of Wilmington. Over the past twenty years development patterns have changed to the extent that in 1970 the county's population was almost equally divided between the city and the rural areas of the county.

This process of suburbanization is the product of many factors -- city-county tax differentials, transportation patterns, land availability, and residential amenities, to mention a few. The process is usually associated with patterns of urban sprawl which has important implications for the Comprehensive Planning Program. There must be close cooperation and coordination between the various agencies and departments of city and county government having responsibility for developing comprehensive plans. Without this cooperation and coordination, the development of public facilities may, through their tendency to attract residential growth, further contribute to the development of sprawl patterns resulting in the inefficient use of land resources and the inefficient expenditure of tax resources.

Within the rural areas of the county, the growth trends have been uneven also. In 1970, Harnett Township in the northeast and Masonboro Township in the central portion of the county had the largest populations. Because of their locational characteristics -- close proximity to the City of Wilmington and the recreational resources of the county's beach areas -- these townships will remain growth areas of the county. At the same time, however, it is important to note that, during the 1960's, the annual growth rates of Federal Point and Cape Fear Townships -- both approximately 4.5 percent -- were the highest of any area in the county. Thus, it is reasonable to expect that these areas will receive an increasingly larger share of the county's population growth.

TABLE 4

COMPARISON OF SUBAREA GROWTH TRENDS 1950, 1960 AND 1970

Area	Population			Average Annual Growth Rate			Share of Total County Population		
	1950	1960	1970	50-60	60-70	1950	1960	1970	
New Hanover County	63,272	71,742	82,996	1.3%	1.50%	N.A.	N.A.	N.A.	
Urban area ^b	45,043	44,013	46,169 ^c	-0.23%	0.48%	71.2%	61.3%	55.6%	
Rural area	18,229	27,729	36,827	4.13%	2.82%	28.8%	38.6%	44.4%	
Cape Fear Twp.	3,844	4,238	6,734	1.00%	4.55%	6.1%	5.9%	8.1%	
Federal Point Twp.	2,473	3,234	5,113	2.67%	4.50%	3.9%	4.5%	6.2%	
Harnett Twp.	8,421	14,427	17,427	5.26%	1.88%	13.3%	20.1%	21.0%	
Masonboro Twp.	3,491	5,830	7,553	5.02%	2.57%	5.5%	8.1%	9.1%	

^a Calculated from U.S. Census data.

^b For this analysis, urban area considered to be Wilmington Township.

^c Wilmington Township 1960-70 population increase includes additions from annexation in 1964.

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II. POPULATION DYNAMICS

A. FACTORS AFFECTING NEW HANOVER COUNTY'S POPULATION GROWTH

New Hanover County's recent population growth is the result of two basic processes -- natural increase and net migration. Natural increase is an internal growth factor which consists of the excess number of births over deaths. Migration, on the other hand, is an external factor which is determined by the net effect of in-migration and out-migration, and which may add to or offset the effects of natural increase. The main purpose of this section is to analyze these processes and thereby obtain a better understanding of the planning area's future growth environment.

1) Natural Increase

Natural increase is normally expressed as a rate^a which relates excess births over deaths to total population. Implicit in the natural increase rates are the jurisdiction's birth rates (fertility rate) and death rates (mortality rate). While natural increase is adequate for explaining population growth in quantitative terms, it tends to obscure changes in birth and death rates which may point to more fundamental changes in the social and economic composition of the population. Therefore, in addition to analyzing trends in natural increase, it is also useful to examine trends in the county's birth and death rates.

Over the past twenty-four years, the importance of natural increase as a component of New Hanover County's total population growth has decreased dramatically. During the 1950's, the average annual rate of natural increase was relatively high -- 16.4 percent -- and was the only source of growth since the county experienced a net out-migration for the ten year period. However, between 1960 and 1970, the natural increase rate dropped to 9.5 percent, and in the past four years (1970-1973) dropped further to 8.7 percent.

Trends in Wilmington's rate of natural increase provide a sharp contrast to the county as a whole. While the county's natural increase has been declining from a relatively high level during the 1950's, the city's rate of natural increase has remained low and stable. During the 1960's, the city's rate was approximately 3.2 percent, and between 1970 and 1974 it averaged 3.1 percent per year. These apparent inconsistencies between the natural increase rates of city residents and the county as a whole are the result of changes in the socio-economic characteristics of Wilmington residents produced by long-term out-migration from the city. These trends will be discussed in more detail in later sections.

^aNatural increase = total births - total deaths.

$$\text{Average annual rate of natural increase} = \frac{(\text{number births-deaths}) \times 1000}{\frac{1960 \text{ population} + 1970 \text{ population}}{2}}$$

2) Birth Rates

New Hanover County births are the most complex of the county's growth variables. They reflect such diverse factors as the level of economic activity in the area, the level of education of county residents, the degree of industrialization, the residents' attitudes toward ideal family size, and the ethno-economic characteristics of the population. It is stressed, therefore, that these variables acting in concert often make it difficult to fully explain changes in birth rates.

New Hanover County's birth rate^a trends for the past ten year period, which are plotted in Figure 3, exhibit three fairly distinct phases. In the first phase, extending from 1963 to 1966, the total birth rate declined from a high of approximately 21.0 percent to a low of 17.0 percent. Between 1966 and 1970, the county's birth rate accelerated, reaching almost 21.0 percent in 1970. Since 1970, the birth rate has again entered a declining phase, falling to 17.2 percent in 1973.

The county's total birth rate trends have been further analyzed using the "least squares" method -- a technique which averages, or "smooths out", the annual variations to show the general trend. The "least squares" trend line plotted in Figure 3 reveals a slight overall downward trend in the county's birth rate. The "least squares" value for the birth rate in 1963 is 19.7 percent, and in 1973 it is 18.3 percent.

Wilmington's birth rate trends are plotted in Figure 4. While showing somewhat more erratic annual fluctuations, the city's trend line follows the three cycles which have been described for the county. Similarly, a "least squares" analysis of the city's birth rate trend reveals a slight overall decline for the 1963-73 period.

3) Death Rates

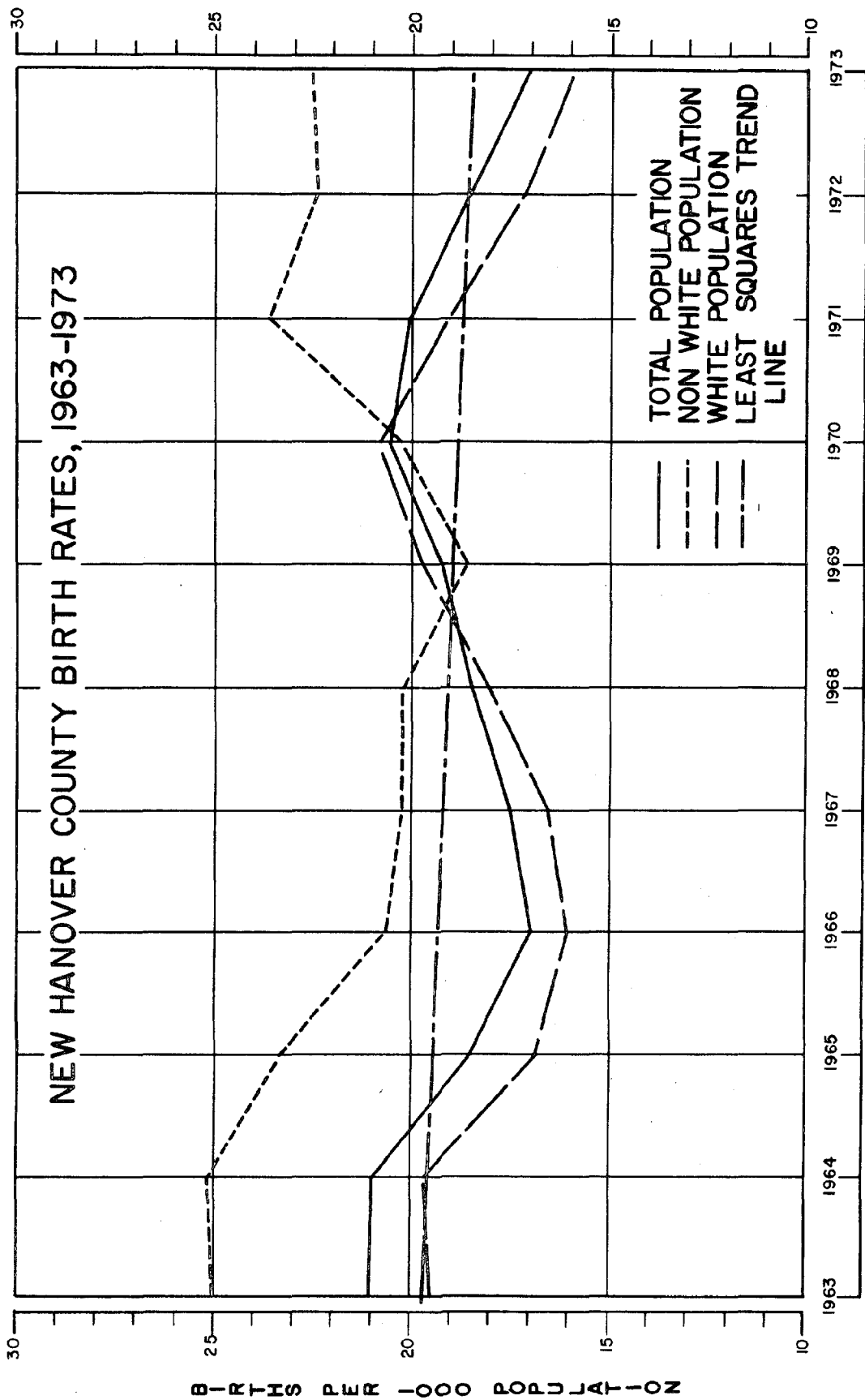
Deaths have traditionally been the most stable of the three variables which produce population change. There is a close relationship between age and the risk of death, and age may be considered the most important variable determining a population's death rate. It is emphasized, however, that other contributing factors, such as race, level of health care, occupation, and place of residence, also have a bearing on the death rate.

^aBirth rates are computed for the total population and race-specific components of the population according to the following formula:

$$\text{Crude birth rate} = \frac{\text{number of live births}}{\text{population}} \times 1000$$

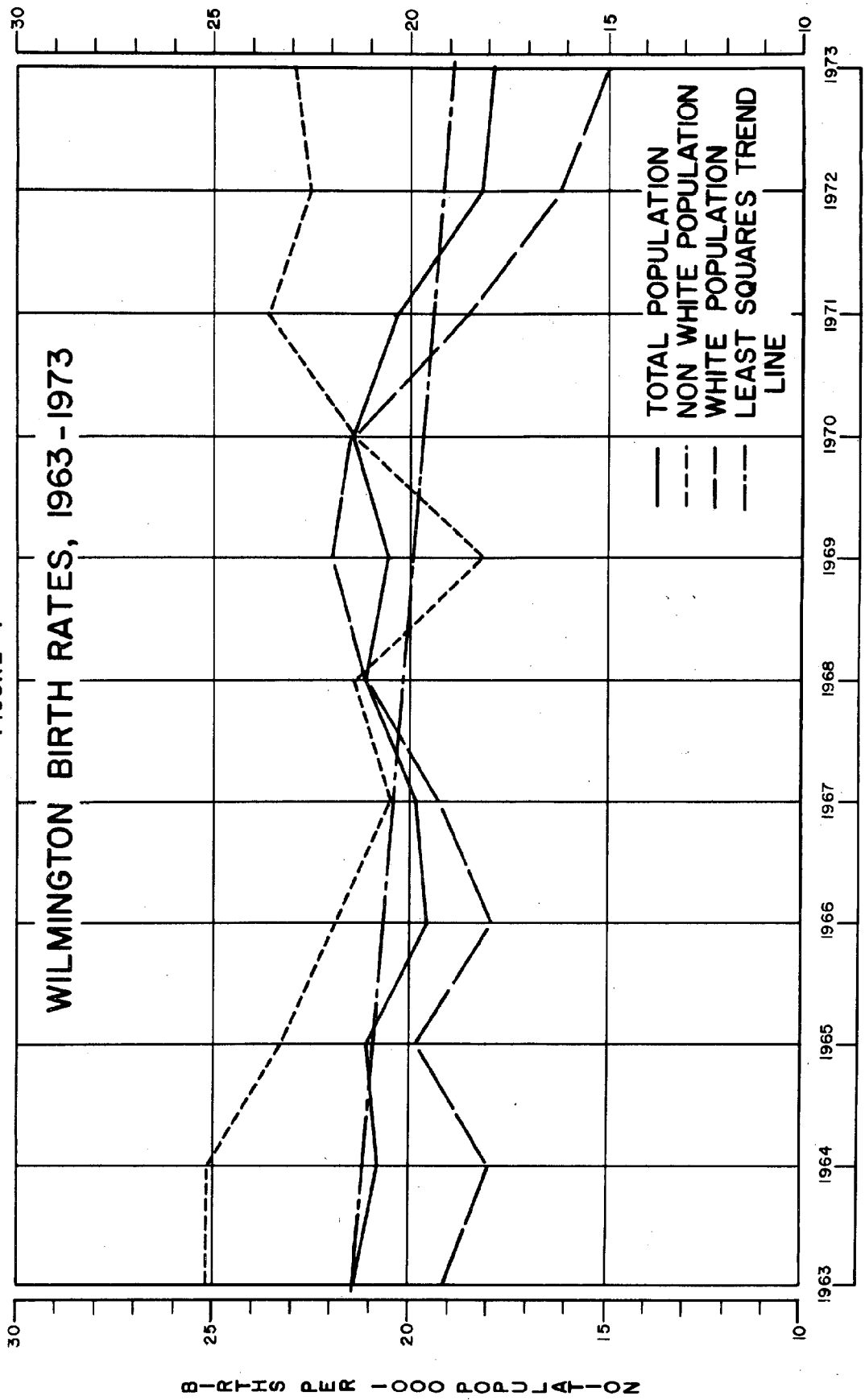
Using this formula, then, the "race-specific" birth rates presented in this report should be viewed as indicators of social characteristics rather than from the standpoint of race-specific contributions to natural increase. In other words, even though the nonwhite birth rate is higher than the white birth rate, there are more white live births in absolute numbers than non-white births.

FIGURE 3



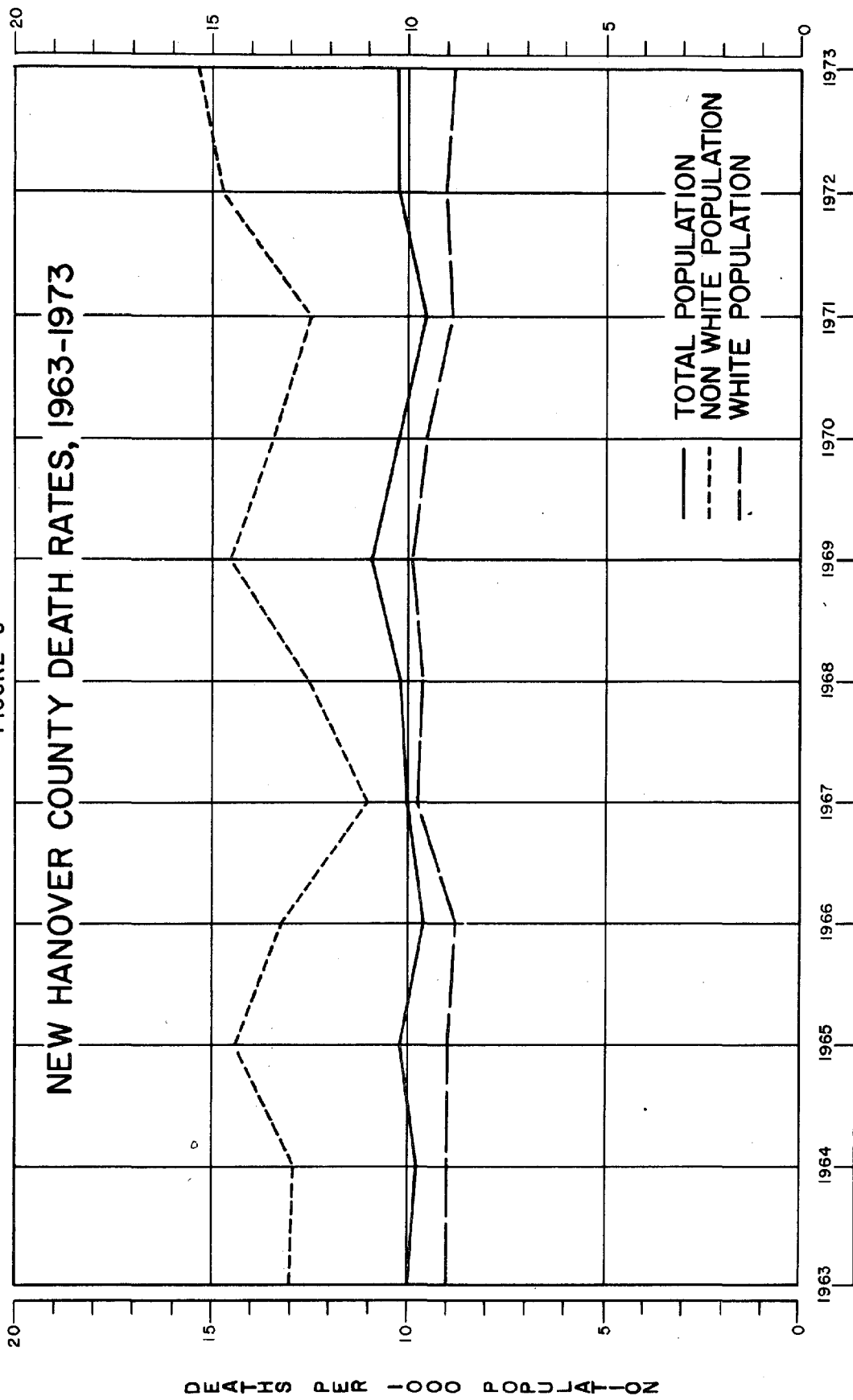
SOURCE: N.C. STATE BOARD OF HEALTH, VITAL STATISTICS

FIGURE 4



SOURCE: N. C. STATE BOARD OF HEALTH, VITAL STATISTICS

FIGURE 5



SOURCE: N.C. STATE BOARD OF HEALTH, VITAL STATISTICS

The county's total death rates and its race-specific components for the 1963-1973 period are plotted in Figure 5. As expected, the total county rate has remained relatively stable for the eleven year period, and the rate for the white population has followed this trend closely. The death rate for the county's nonwhite residents, on the other hand, has shown significant annual fluctuations and has been consistently higher than the rate of the white population. By making the somewhat tenuous assumption that factors such as access to health care is uniform for both groups, then it appears that the higher death rate of the nonwhite population is primarily the result of an aging population produced by long-term out-migration of nonwhites in the younger age groups.

4) Migration

a) COUNTY

During recent years, migration rather than natural increase has been the most important variable in the county's overall population growth and in the development of growth differentials within the county. People migrate for many reasons, but primary among these are better economic opportunities, better and more abundant housing, and better recreational opportunities and social benefits. All of these factors are evident in New Hanover County's migration trends.

Table 5 shows the county's migration rates for the 1950's and 1960's and provides a comparison of the recent migration trends of the urban and rural portions of the county. During the twenty year period between 1950 and 1970, the county's migration showed a reversal from a net out-migration during the 1950's to a relatively significant in-migration of 5.4 percent during the 1960's. This reversal is the result of a significant expansion of county employment opportunities, beginning in the early 1960's. This aspect of the county's growth will be discussed in more detail in a subsequent section analyzing the county's economy.

TABLE 5

NEW HANOVER COUNTY MIGRATION RATES

Area	1950-60		1960 - 70	
	Number	Rate	Number	Rate
New Hanover County	-2,599	-4.1	3,868	+ 5.4
White	-----	----	6,747	+13.0
Nonwhite	-----	----	(-2,879)	(-14.4)
Wilmington	-----	----	(-1,923)	(- 4.4)
White	-----	----	250	+ 0.9
Nonwhite	-----	----	(-2,173)	(-13.1)
Rural New Hanover	-----	----	5,791	+20.9
White	-----	----	6,497	+26.7
Nonwhite	-----	----	(- 706)	(-20.9)

Source: Wilmington-New Hanover Planning Department.

b) URBAN-RURAL

Within the county there are sharp contrasts between the migration rates of Wilmington and the rural areas of the county and between the white and nonwhite population. Between 1960 and 1970, the city experienced a net out-migration of 4.4 percent while the rural or suburban areas of the county showed a net in-migration of more than 20 percent. There is good evidence that a significant portion of residents leaving the city are locating in the suburban areas of the county. For example between 1960 and 1970, the county as a whole experienced a net in-migration of 3,858 persons, while the rural portion of the county gained 5,791 residents and the city lost 1,923 residents through migration. This is equivalent to suburban New Hanover County receiving all 3,858 in-migrants to the county, plus 1,923 residents from the city.

The principal causes of migration discussed above are evident in this movement of population toward the suburban areas of the county. Subdivision activity is much higher in the county than in the city, and the result has been greater availability of housing in the suburban areas.

Taxes are also a significant factor. The 1974 ad valorem tax rate for the unincorporated areas of New Hanover County is \$0.79 per \$100 valuation, while that for city residents is \$2.04 per \$100 valuation. Although more urban services are available to city residents, economics appear to be an important factor in the decision of many families to reside outside the city.

c) WHITE-NONWHITE

In recent years, New Hanover County and the City of Wilmington have experienced heavy out-migration within the nonwhite population. Between 1960 and 1970, the county as a whole experienced a net out-migration of 2,647 nonwhite residents -- a rate of -14.4 percent for the decade. Since most of the county's nonwhite population resides within the city, the bulk of this out-migration occurred among city residents. The city's out-migration rate for nonwhites during this period was -13.1 percent.

It is reasonable to assume that this heavy out-migration among non-white residents has been a response to the combined effects of limited employment opportunities within the New Hanover County economy and the prospect for jobs in other areas. As the county's economy continues to expand, the access of nonwhites to employment should improve, having the effect of lowering out-migration.

New Hanover County's migration trends will have a significant impact on the structure of the county's population. A nationwide study by the Bureau of the Census during the 1950's and 1960's revealed that the migrating population had a median age approximately ten years younger than the non-migrating population. The modal age category, or the age group appearing most frequently, of the migrating population was 20 - 24 years. The migrating population also abounded with pre-school children. Men and women between the ages of 20 and 44 -- the child bearing years -- constituted 48 percent of the migrating population and only 31 percent of the non-migrants.

Thus, the county's strong in-migration trends will have the overall effect of lowering the population's median age and increasing the fecundity^a rate. Whether the increased fecundity rate will be translated into an increased birth rate is dependent upon diverse social and economic variables.

Within the City of Wilmington, the situation is different. If the heavy out-migration trends continue, the city's population will experience an increasing median age and a further lowering of the birth rate.

^aFecundity is defined as the physiological capacity to reproduce.

III. ESTIMATES OF CURRENT POPULATION

Due to the significant changes in New Hanover County's population since the 1970 census, it is necessary to derive an estimate of the county's current population. A Census Bureau technique which is based on vital statistics and school enrollment data has been utilized to prepare current estimates. Essentially, the technique uses births and deaths reported by the N. C. State Board of Health and migration rates calculated from school enrollment data to derive an estimate.

A current population estimate and its births, deaths, and migration components are found in Table 6. The significant reversal of nonwhite out-migration should be noted. During the 1960's, the county's nonwhite population experienced a net out-migration of 14.4 percent; however, based on school enrollment data for the 1970-74 period, a 1970-80 net in-migration of 5.8 percent is projected for the nonwhite population. At the same time, the county's white migration rate is projected to rise to 16 percent.

It is reasonable to assume that the 1970-74 trend on which these estimates are based is an indication of expanding employment opportunities within the county.

TABLE 6

NEW HANOVER COUNTY POPULATION ESTIMATE^a, DECEMBER, 1974

Population Group	Growth Component April 1970-Dec. 1974				Population		
	Births	Deaths	Net Migration		1970	Dec. 1974 Estimate	1970-74 Growth Rate
			Number	1970-80 Rate			
Total	7,509	4,008	5,424	13.5%	82,996	91,921	10.7%
White	5,570	2,789	4,889	16.0%	63,951	71,621	12.0%
Nonwhite	1,939	1,219	535	5.8%	19,045	20,300	6.6%

^aComputed from U.S. Bureau of Census, N.C. State Board of Health, and New Hanover County Board of Education data. A detailed description of this method can be found in The Methods and Materials of Demography, Vol. 2, P. 751, U.S. Department of Commerce, Bureau of the Census, May 1973.

IV. POPULATION COMPOSITION

The second major element of this study deals with the county's population composition and its implications for the Comprehensive Planning Program. Although, in strict demographic terms, "composition" refers to all of the characteristics of the people who comprise the county's population, the information and analysis in this section have been limited to those factors which are most relevant to the county's planning program and which will best explain the growth processes outlined in the first section of this report.

Within the context of the comprehensive planning process, the study of population composition is intended to serve three main purposes:

1. To provide a basis for estimating demand for public and private services and facilities;
2. To provide an information base for designing resource development programs by documenting the planning area's socio-economic problems and prospects;
3. To identify the social factors related to the growth processes outlined in the first part of the study.

These objectives suggest that four basic characteristics are essential in the analysis of the planning area's population composition: sex, age, race, and income. These characteristics, then, are the major focus of this section of the report.

A. AGE AND SEX COMPOSITION

Age and sex are the most basic of the population characteristics, because age and sex groupings are traditionally viewed as the "building blocks" of the population. As such, they are important considerations in the comprehensive planning process. Age structure is an important variable in estimating requirements for facilities and services, schools, health care, housing, and recreation; sex and age characteristics are important elements in natality, mortality, and migration trends. In addition, the balance of the sexes, or distribution between male and females, affects social roles and employment patterns in the community.

1) Sex Composition

The population sex ratio is a principal measure of sex composition used in technical studies. This measure is defined as the number of males per 100 females, or mathematically:

$$\text{Sex ratio} = \frac{\text{Total males}}{\text{Total females}} \times 100^a$$

^aU.S. Bureau of the Census, The Methods and Materials of Demography, by Henry S. Shryock, Jacob S. Siegel, et al (Government Printing Office: Washington, D. C., 1971) p. 191.

The basic assumption inherent in this method of evaluating sex composition is that the expected distribution of population between males and females is exactly even, resulting in a ratio of 100.0, and that major deviations from this standard reveal an excess of males or females in a population.

A second measure of sex composition is the excess (or deficit) of males as a percent of the total population which is stated mathematically as:

$$\frac{\text{Total males} - \text{Total females}}{\text{Total population}} \times 100$$

In this method the balance point between the sexes is zero; therefore, a positive value denotes a relative excess of males and a negative value denotes an excess of females.^a

While conveying essentially the same information, the sex ratio method relates the two population groups to each other whereas the measure of male excess (or deficit) relates the distribution of population between sexes to the total population. Both these measures for Wilmington and New Hanover County are shown in Table 7.

TABLE 7
MEASURES OF SEX COMPOSITION -- 1950, 1960, and 1970

	Year	Male	Female	Total	Sex Ratio	Percent Male Excess or Deficit
New Hanover County	1950	30,038	33,234	63,272	90.38	(-5.05)
	1960	34,223	37,519	71,742	91.22	(-4.59)
	1970	39,667	43,329	82,996	91.55	(-4.41)
City of Wilmington	1950	N/A	N/A	N/A	N/A	N/A
	1960	20,485	23,528	44,013	87.07	(-6.91)
	1970	21,245	24,924	46,169	85.24	(-7.97)

Source: Wilmington-New Hanover Planning Department, U.S. Bureau of the Census, U.S. Census of Population.

Nationally, sex ratios normally fall within a range of 95 to 102. Therefore, ratios outside the range of 90 to 105 may be viewed as "significant variations".^b Table 7 indicates a male deficit outside the normal

^aU.S. Bureau of the Census, The Methods and Materials of Demography, p. 192.

^bIbid., p. 191

range for New Hanover County, and an even greater disparity for Wilmington into the "extreme" range, where there were only 85 males to each 100 females in 1970.

Because sex ratios may vary between population subgroups the sex composition by race is depicted in Table 8. This table shows that while the county as a whole has a low sex ratio for whites, an even greater sex disparity exists within Wilmington for both races. The deficiency of males is in part attributable to migration patterns for both races.

The disparity in the planning area's sex ratios, especially within the city, has several implications, including the following:

1. Demands for health and social programs designed for women, especially those in the younger and older age groups;
2. More women in the work force and demand for female-oriented industrial activity; and
3. A need for female-oriented job training and education for female heads of households in, or seeking to enter, the labor force; and a concurrent provision for child care if desired.

2) Age Composition

Many planning activities require age data. The age structure of a population considerably affects social relationships within a community and demands placed upon public and private sectors in that community to meet needs. Age composition is an important variable in studies of mortality and fertility, housing demand, school population and labor force composition.

An analysis of the percent distribution of population among age groups permits identification and analysis of changes in the county's age structure over time. This distribution for New Hanover County is illustrated in Figure 6 which shows the percentage of the county's 1960 and 1970 population in five-year age group increments.

Comparing relative changes in age structure between the two censuses reveals a significant decrease in the percentage of population under five years of age and fewer youths in the five to ten age group. This reflects the declines in birth rate previously discussed, with in-migration accounting for the absolute increases in this group. A second trend of major significance occurs in the fifteen to thirty age groups which experienced a relative increase in population between 1960 and 1970. Since these age groups are included in those most directly affected by migration, this trend, in part, reflects a net in-migration most likely resulting from improved economic opportunities within New Hanover County.

The thirty to forty-five age group experienced a relative decrease in population between 1960 and 1970. This characteristic is hold-over from the 1950's when the county experienced relatively heavy out-migration, and it is anticipated that this pattern will be evident in the future as these residents move into successively older age groups.

TABLE 8

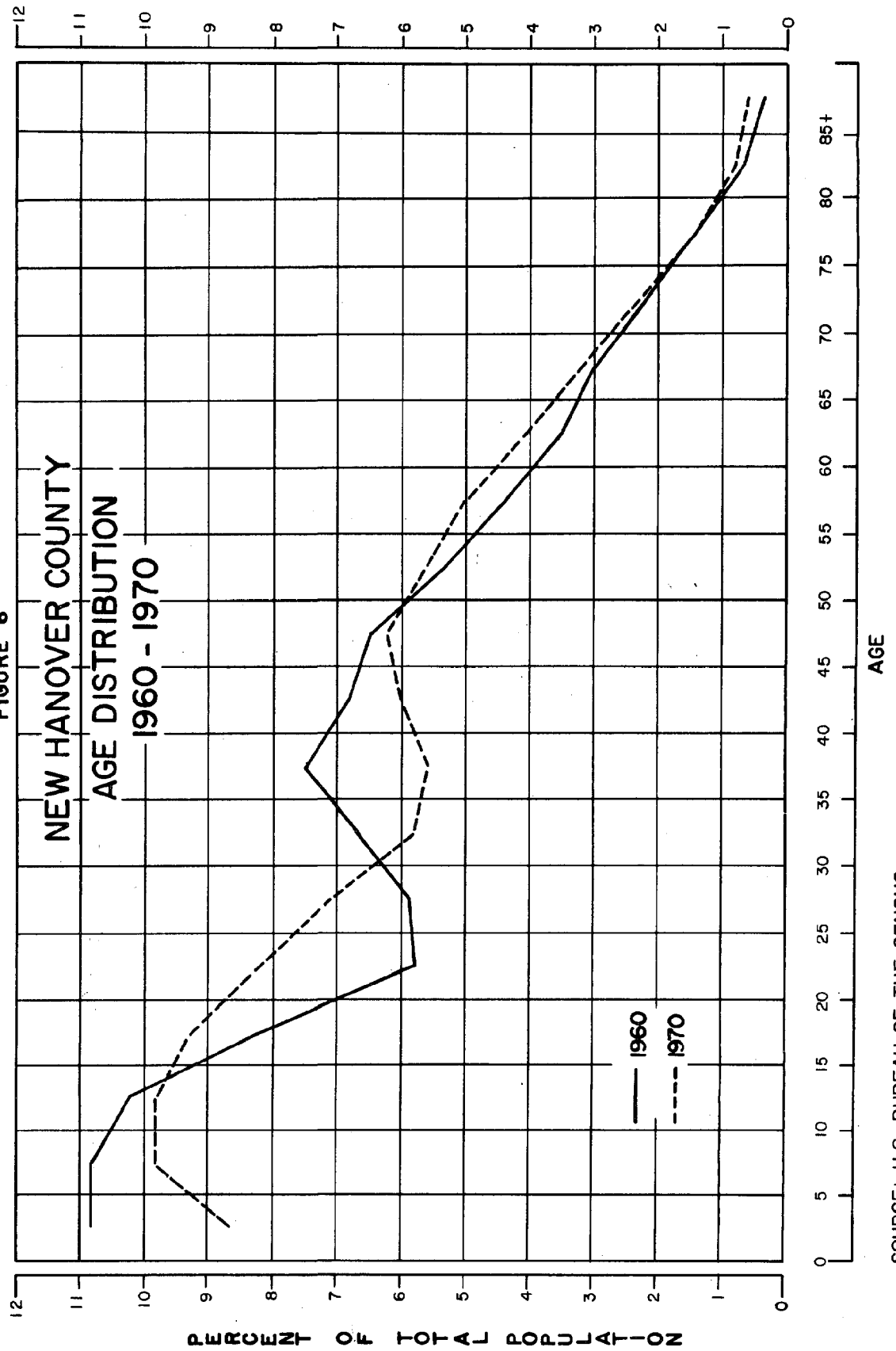
MEASURES OF SEX COMPOSITION BY RACE -- 1950, 1960 and 1970

		Year	White					Nonwhite				
			Male	Female	Total	Sex Ratio	% Male Deficit	Male	Female	Total	Sex Ratio	% Male Deficit
New Hanover County	1950	20,854	22,576	43,430	92.37	(-3.96)	9,184	10,658	19,842	86.17	(-7.43)	
	1960	25,053	26,691	51,744	93.86	(-3.17)	9,170	10,828	19,998	84.69	(-8.29)	
	1970	30,935	33,016	63,951	93.70	(-3.25)	8,742	10,313	19,045	84.67	(-8.30)	
City of Wilmington	1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	1960	12,935	14,460	27,395	89.45	(-5.57)	7,550	9,068	16,618	83.26	(-9.13)	
	1970	13,993	16,122	30,115	86.79	(-7.07)	7,252	8,802	16,054	82.39	(-9.65)	

Source: Wilmington-New Hanover Planning Department; U.S. Bureau of the Census, U.S. Census of Population.

FIGURE 6

NEW HANOVER COUNTY
AGE DISTRIBUTION
1960 - 1970



SOURCE: U.S. BUREAU OF THE CENSUS

Median age is a statistical measure of age composition which may be defined as the age which divides the population into two equally-sized groups, one younger and the other older than the median age. For comparative purposes those populations with a median age under twenty may be defined as "young", those with medians between twenty and twenty-nine as "intermediate", and those thirty and over as "old".^a

Based on census information New Hanover County has experienced a slight drop in median age between 1960 and 1970, from a median age in 1960 of 28.6 to 27.8 in 1970. Both of these are in the "intermediate" range (See Table 9), but, as already noted, the relative percentages of persons in older age groups have been increasing. Therefore, this decrease in median years reflects the countering effect of the increases in the late teen years and early twenties.

TABLE 9

NEW HANOVER COUNTY MEDIAN AGE -- 1960 and 1970

	New Hanover County			Wilmington		
	Total	Male	Female	Total	Male	Female
1960	28.6	26.9	30.1	29.1	26.6	31.1
1970	27.8	26.3	29.2	28.6	26.2	31.1

Source: U.S. Census of Population

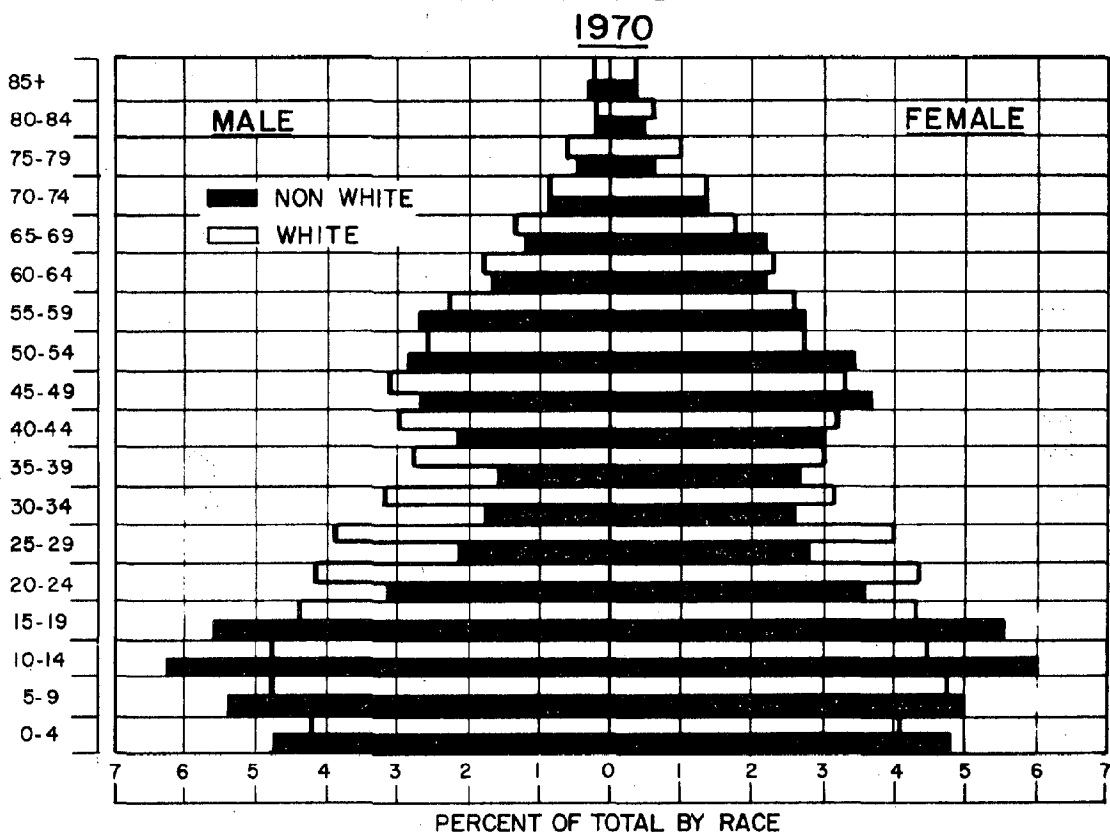
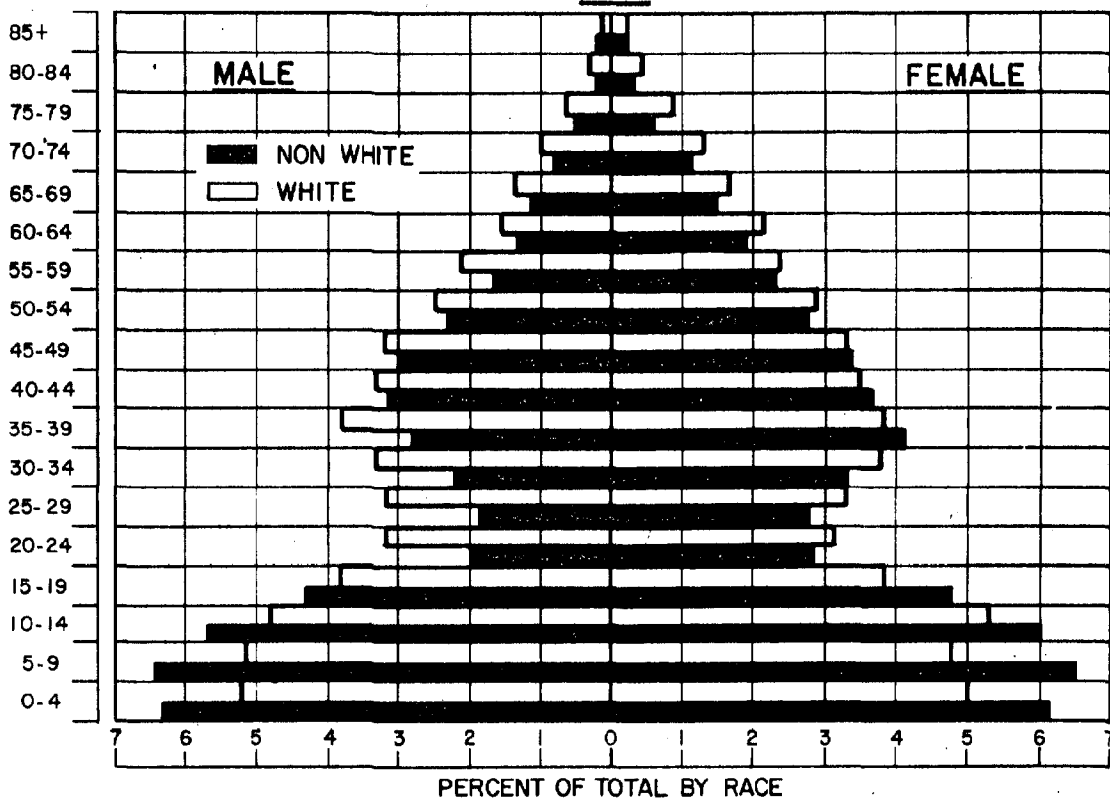
3) Age - Sex Composition

A "population pyramid" is an effective method of graphically depicting the age-sex composition of a population. The basic population pyramid is designed to display the age-sex structure of a population, in this case in five year increments, in ascending order from the lowest to the highest, horizontally pyramided on one another. Each bar represents the number of persons within a specific five-year age group. The bars for females are given on the right of the central vertical axis with the bars for males being shown on the left of the axis.

A normal population pyramid has no appreciable sags or large jumps between each age increment, and as shown in Figure 7, this typical situation does not exist in New Hanover County. The county's pyramids show that a large segment of young adults and middle aged persons are absent from the population. Since these years are normally those of productivity in the

^aThe Methods and Materials of Demography, Vol. 1, p. 234, U.S. Department of Commerce, Bureau of the Census, May 1973.

FIGURE 7
AGE DISTRIBUTION
NEW HANOVER COUNTY - 1960 & 1970



work force, this decrease indicates an abundance of dependent persons, both young and old in New Hanover County. The major causative factor is out-migration prior to the 1960's resulting primarily from better employment opportunities elsewhere.

During the 1960's, the number of white youths in the 0-4 age group, and to a lesser extent in the 5-9 group, decreased substantially relative to total population. This pattern is even more pronounced in the nonwhite population for these age groups.

A second observation of change over the decade is that exhibited by the white population in the age groups fifteen to twenty-nine where a substantial relative increase occurs. This trend is observable also in the ten to twenty-four year age groups of the nonwhite population. However, these increases are off-set by a decrease in the percent of the total population in the age groups between thirty and forty-four, a characteristic which is a remnant of the out-migration experienced prior to the 1960's.

Both subgroups exhibit a relative increase in the number of persons in the forty-five years and older groups. Implicit in the increase in concentration of older aged persons in the community is the need to provide adequate recreational, housing, economic, and health care programs to meet the characteristic needs of that sector of the population.

B. INCOME CHARACTERISTICS

Accurate evaluation of the overall economic well-being of the planning area's residents is difficult because there are no indicators available which give a comprehensive view of the economic welfare of various segments of the population and at the same time remain sensitive to significant life-style variations among various families in the planning area. However, by making the simplifying assumption that life-styles in the area are similar, the accessibility of goods and services is perhaps the best measure of economic well-being; and income, as a rough measure of the household's access to goods and services, can be used as a crude indicator of overall economic well-being.

1) Average Income

Average income is one of the most common measures of a population's income characteristics; statistically, however, there are several techniques for devising an average. The implications of using a particular technique should be understood because the improper use of income averages can bias the income analysis.

Mean and median income values are the "average" measures which have been used in this report to analyze income characteristics; however, it is important to make a careful distinction between the meaning of the two measures. Most people when speaking of the "average" are actually referring to the arithmetic mean, and in the case of incomes, the mean is simply the sum of all family incomes divided by the number of families. Since this measure does not account in any way for the distribution of income, it may be considered a summary average which reflects the total income available in the planning area.

The median, as a measure of average income, is the income level at which half the families make more and half the families make less. Median income values are a measure of income distribution, and as such, they might be considered a typical average which gives a rough idea of the typical income of families in the area.

Thus, in an area where there exists a considerable disparity between the number of families in the lower income groups and those in the upper income groups, the median income may be considerably below the mean income. However, only in the case of a perfectly even income distribution will they be equal.

2) Planning Area Income Trends

Analysis of the average income statistics found in Table 10 reveals some highly significant changes in the planning area's overall income characteristics during the 1960-70 decade. Although Wilmington's median family income moved closer to the mean during the past decade, there is still a considerable disparity between the two values in both 1960 and 1970, indicating an uneven distribution of income with a concentration of families in the low income categories. On the other hand, the data show that families residing in areas outside the Wilmington City Limits have moved from a situation of even income distribution to one more closely resembling that of the city with a disproportionately large number of families in the lower income group. The 1960 mean and median values for rural families are almost equal, but in 1970 the median is far below the mean.

These apparent changes in income distribution appear to be related to changes in the planning area's residential settlement patterns. In-migration of high income families resulting from expansion of the area's economy together with the development of a number of residential subdivisions in the unincorporated areas of the county has produced an increase in the percentage of high income families residing outside the city.

TABLE 10
PLANNING AREA MEAN INCOME VALUES, 1960 and 1970^a

Area	1960	1970	Percent Increase 1960-70
Wilmington City			
Family Income			
Mean	\$5,162	\$ 8,651	67.6
Median	\$3,870	\$ 6,986	80.5
Rural New Hanover			
County Family Income ^b			
Mean	\$5,224	\$10,804	106.8
Median	\$5,002	\$ 8,547	70.9

Source: ^aU.S. Bureau of the Census, General Social and Economic Characteristics, 1960, 1970. ^bRural New Hanover County defined as all area outside city limits of Wilmington, including small incorporated areas. Income data is not reported for this geographical area; therefore, average values presented are estimates based on calculations using tabulations of income distribution.

Although the statistics show a tendency toward unevenness in the distribution of income in areas outside the city, it should be emphasized that "rural" families have remained in a relatively better economic position than families residing in the city. In 1960, the typical city family income was \$3,870 compared to a typical rural county resident income of \$5,002 -- 29 percent higher. In 1970, the situation was similar. The typical income of a city family was \$6,986 while that of the county was \$8,547.

In addition to showing relative changes in the distribution of income in the planning area, the 1960-70 family income trends also point to an actual improvement in the economic well-being of the area's residents. Table 11 presents a conversion of the average income information found in Table 10 to constant 1967 dollars. By converting to constant dollars and thereby discounting inflation, it is possible to better evaluate the area residents' actual increase in purchasing power.

With the effects of inflation removed, the income statistics in Table 11 reflect a real upward trend in the income of typical planning area families. Between 1960 and 1970, the constant dollar median income for Wilmington families increased almost 38 percent, from \$4,361 to \$6,008. The median income for rural county families showed a corresponding increase of 30.4 percent during the same period.

This apparent improvement of family incomes can be attributed to changes in the structure of the planning area's economy during the past decade, and recent shifts in the characteristics of the area's employment provide an illustration of how economic expansion has affected incomes. In 1962, almost 75 percent of the planning area's total manufacturing employment was in nondurables -- employment which is characterized by stability, but relatively low wages. By 1972, the nondurables share of total employment had decreased significantly, and employment in durables with related higher wages had increased to 47 percent of the total manufacturing employment.^a It should be noted that this increased dependence on durables employment brings with it a somewhat higher risk of instability during periods of extremely adverse national economic conditions.^b

3) Income Characteristics of Major Population Subgroups

Within the planning area's environment of generally improving economic conditions, it is important to examine the relative economic positions of the major subgroups of the area's population. In order to make these relative comparisons, an income index has been constructed to relate the median incomes of white city families, nonwhite city families, rural county families and the median state income which is used as a standard. Median state income has been chosen as a standard of comparison because it represents a geographic area having a similar life-style and economy to that of the planning area; and, it contains a sufficiently large sample of families not to be affected substantially by extreme local variations.

^aNorth Carolina Employment Security Commission, Annual Work Force Estimates, (Raleigh, 1972).

^bWilbur R. Thompson, A Preface to Urban Economics, (Resources for the Future, Inc.: Washington, 1968), pp. 150-160.

TABLE 11

AVERAGE INCOME VALUES IN CONSTANT DOLLARS -- 1960 and 1970

Area	Constant 1967 Dollars		Percent Increase 1960-70
	1960	1970	
Wilmington City Family Income			
Mean	5,818	7,440	27.9
Median	4,361	6,008	37.8
Rural New Hanover County Family Income			
Mean	5,887	9,291	57.8
Median	5,637	7,350	30.4

Source: Wilmington-New Hanover Planning Department; U.S. Census of Population.

TABLE 12

INCOME INDICES FOR PLANNING AREA POPULATION GROUPS -- 1960 and 1970

	Income Index		1960-70 Change
	1960	1970	
Wilmington White Families	0.27	0.09	(-0.18)
Wilmington Nonwhite Families	(-0.42)	(-0.46)	(-0.04)
Rural County Families	0.26	0.10	(-0.16)

Source: Wilmington-New Hanover Planning Department; U.S. Census of Population.

The income index for each population group is calculated as follows:

$$\text{Income Index} = \frac{\text{Subgroup median family income}}{\text{State median family income}} - 1$$

Calculated in this manner, the income indices can be interpreted as follows:

1. A positive index indicates that the population group is relatively better-off than the reference population;
2. A negative index indicates that the population group is relatively worse-off than the reference group; and,
3. A positive 1960-1970 change indicates an improvement in the group's economic conditions, and a negative change indicates a deterioration.

Based on these guidelines, the income indices in Table 12 show first, that the economic position of all three population groups declined relative to the state median family income during the 1960-70 decade; however, it is important to note that the income of typical Wilmington white families and rural county families remained substantially above that of the state in 1970, despite the sharp decline for the decade. Nonwhite families, on the other hand, exhibit extremely low income indices for both 1960 and 1970, but with a smaller decline during the decade.

The underlying factors which have produced these trends will be discussed in detail in an analysis of the planning area's economy; however, there appear to be at least two factors influencing the income characteristics of the major population:

1. While the area's expanding economy has produced changes in employment characteristics, the structure of the state economy has also changed;^a and,
2. Structural unemployment and underemployment among nonwhite families resulting from remnants of economic discrimination and inadequate education.

4) Implications of Income Characteristics

The family income trends which have been described for the planning area are intended to provide an overview of the residents' income characteristics. Using primarily median income as a measure of the economic well-being of typical families, the following factors have been identified:

^aAccording to the Bureau of the Census' Census of Manufacturing, for the years 1954, 1958, 1963, and 1967, per employee wages for the planning area was below that of the state.

1. The distribution of income among families residing in the rural portions of the planning area changed from a relatively even situation in 1960 to an uneven distribution in 1970 with a disproportionately large number of families in the lower income groups.
2. As a group, rural families are economically better off than city families.
3. In both 1960 and 1970 the city contained a proportionately large number of families in the low income range.
4. After removing the effects of inflation, planning area incomes still exhibited significant increases between 1960 and 1970. These increases are related to changes in the area's employment characteristics.
5. Among the major population groups in the planning area, the urban nonwhite population's economic position is the worst, with an extremely large concentration of families in the low income range.

The statistics on which these trends are based are not detailed enough to be useful in the identification of specific problems related to income. They do, however, reveal several issues or concerns which should be explored in subsequent studies. Specifically, the following questions appear to be relevant:

1. Are there inequities in city and county tax structures and if so, how can they be minimized?
2. How do income differentials affect housing demand and production problems?
3. Can economic development programs be designed to help alleviate severe income differentials among the planning area's residents?
4. What specialized facilities and services -- particularly in the area of education -- are indicated by the area's income characteristics?

C. HOUSEHOLD CHARACTERISTICS

A population's family composition is a significant demographic element in that it shows the circle of persons who function together as a unit for purposes of providing a livelihood, bearing and rearing children, rendering mutual care in times of stress, and sharing in various social and recreational activities. In this section an historical trend of households by type will be reviewed and important subgroup characteristics analyzed.

A trend occurring nationally during the past several years has been that of a decreasing average household size. This trend has been experienced by New Hanover County as well. Three factors contributing to this decrease are (1) the slightly declining county birth rate, (2) an increase in single member households, and (3) the increased incidence of older households with

no children present. In this section these single member households, households with female heads, Black households and average household size will be analyzed, trends discussed, and future household size estimated.

1) Average Household Size

Since the 1950 census the average size of a household in New Hanover County has been decreasing (See Table 13). The average household size over the three decade period has been smaller within the city than in the county, with the 1970 average city household size slightly less than three persons (2.95) and the county average at just greater than three persons (3.08).

The 1960 and 1970 censuses also list average household size for Blacks within the city and county. During the decade the average Black household size within the city decreased from 3.69 to 3.32, and from 3.75 to 3.37 for New Hanover County, both reflecting the trend of Black families toward smaller average household size. It should be noted that the Census of Population has two "household" components, families and primary individuals, and this decrease in part reflects the increase in single member households as well as the actual decrease in size of families.

With the number of variables which influence the size of households -- factors such as religious attitudes, economic conditions, and the overall age of the population -- it is difficult to accurately forecast future household size. However, using the "least squares" projection technique and historical household trends, it is estimated that the average household size for New Hanover County in 1980 will be approximately 2.9 persons. This factor will be an important consideration in the determination of housing demand and land needs.

2) Single Member Households

One member households have been increasing in the nation, a trend which is also occurring in New Hanover County (See Table 14). Three basic reasons for this increase are a higher percentage of single people (never married), a lower percentage of married individuals, and a higher percentage of divorced individuals. It is expected that this trend will continue in New Hanover County and, if so, housing stock should reflect the needs and life-style of these people.

3) Female Head of Household

The number of women who head families has been increasing rapidly over the past several years. Causal variables cited for this rise in female family headship include high rates of marital dissolution through divorce and separation, an increase in the number of single female heads, the liberalization of adoption procedures permitting single parenthood, the increased economic independence and participation in the labor force of many women, and an increased availability of public assistance programs.

In addition to the sociological implications of a matriarchal versus a patriarchal family structure there are economic factors associated with female family headship. Of the 3,153 families in New Hanover County with incomes below a federally defined poverty level, 45 percent had a female head. (See Table 15) Further, female headed families comprised 52 percent

TABLE 13

AVERAGE HOUSEHOLD SIZE
WILMINGTON-NEW HANOVER COUNTY, 1950, 1960 and 1970

	Wilmington			New Hanover County		
	1950	1960	1970	1950	1960	1970
Total	3.42	3.29	2.95	3.51	3.37	3.08
White	--	3.08	2.83	--	3.30	3.00
Black	--	3.69 ^a	3.32	--	3.75 ^a	3.37

Source: U. S. Census of Population.

TABLE 14

SINGLE MEMBER HOUSEHOLDS
WILMINGTON-NEW HANOVER COUNTY, 1960 and 1970

	Wilmington		New Hanover County	
	1960	1970	1960	1970
Total	2228	3513	2937	4784
White	1367	2325	1957	3468
Black	861 ^b	1188	980 ^b	1316

Source: U.S. Census of Population.

^a1960 data include all nonwhites.

^b1960 data include all nonwhites.

TABLE 15

FAMILY INCOME IN NEW HANOVER COUNTY, 1969

	Total	Income Less Than		
		Poverty Level	75% Poverty Level	125% Poverty Level
Total Families	\$21,994	\$3,153	2,161	4,360
Percent of All Families	--	14.3	9.8	19.8
Mean Family Income or Deficit ^a	\$ 9,368	\$2,021	(-\$1,114)	(-\$1,851)
Families with Female Head	3,055	1,427	1,113	1,716
Mean Income	\$ 4,289	--	--	--
Percent of Total	14	45	52	39

Source: U.S. Census of Population, Table 124; Wilmington-New Hanover Planning Department.

TABLE 16

HOUSEHOLD HEADSHIP IN NEW HANOVER COUNTY, 1970

	Total	White	Black
In Households	81,869	63,067	18,484
Male Head	18,686	15,885	2,744
Female Head	3,112	1,678	1,422

Source: U.S. Census of Population, Table 36.

TABLE 17

CHILDREN OF FEMALE HEADED FAMILIES IN NEW HANOVER COUNTY, 1970

	Total	White	Black
Female Headed Families	3,112	1,678	1,422
Own Children Under 18	1,717	866	840
Own Children Under 6	612	275	322

Source: U.S. Census of Population, Table 36.

^aNegative sign denotes income deficit.

of all families with an income less than 75 percent of the poverty level. Fourteen percent of New Hanover County's female headed families have a mean income of less than half (46 percent) that of male headed families.

Black females headed over half (52 percent) of the Black households in 1970 for New Hanover County, contrasted with 16 percent for white families. This concentration of Black females is found primarily within the city, (Table 16). Table 17 shows the number of families having children under the ages of six and eighteen.

This high incidence of female headed families again points to the need for the programs and facilities outlined in the section discussing sex composition disparity. It is evident that in addition to the need for health and social programs, female-oriented industrial activity, job training, and provision for child care, many of these female headed families simply may need financial assistance to sustain their families.

V. POPULATION PROJECTIONS

Basic to all long-range planning activities is the need to have an accurate estimate of future population size and composition. There are several methods which can be utilized for projecting the future population of an area. However, the cohort-survival method is widely regarded as the most reliable technique. In this method, total population is broken down into five year age groups, by sex and race, and individually projected. These projections are based on the three major variables which affect population change: birth rates, mortality rates, and migration rates of each age-sex-race group or "cohort-group".

Three different cohort-survival projections were generated by using different growth trend assumptions and are presented in Table 18 and illustrated graphically in Figure 8.

The lowest-valued projection is based upon race-specific migration rates for the 1960-1970 decade and average birth rates for 1969-1973 which, as previously indicated, are declining.

The intermediate-valued projection assures that all trends of the 1960-1970 decade hold constant. This projection, using the Hamilton-Perry method, is based on the same migration rates as the lowest-valued one; however, it also uses the higher birth rate values of the 1960-1970 decade.

The highest-valued projection is a departmentally modified North Carolina State Department of Administration projection. For this projection migration rates were recomputed using race-specific 1970-1973 school enrollment data. This projection differs from the lowest valued projection only by those modified migration rates.

TABLE 18
NEW HANOVER COUNTY POPULATION PROJECTIONS

YEAR	PROJECTED POPULATION		
	LOW	INTERMEDIATE	HIGH
1980	94,038	97,546	101,317
1990	107,613	116,740	124,608
2000	122,829	140,283	151,147

Source: Wilmington-New Hanover Planning Commission

Because the highest-valued projection reflects the latest values of birth and migration rates, it has been selected as the most reliable projection. This projection is illustrated graphically by race in Figure 9.

ADDENDUM 1 (5-21-76)

The 50 year population projection for New Hanover County (year 2025) is 249,000.

This figure is derived by applying the average decennial growth rate of the cohort-survival projection (22 percent) to the year 2020 and an 11 percent growth rate from 2020 to 2025.

FIGURE 8

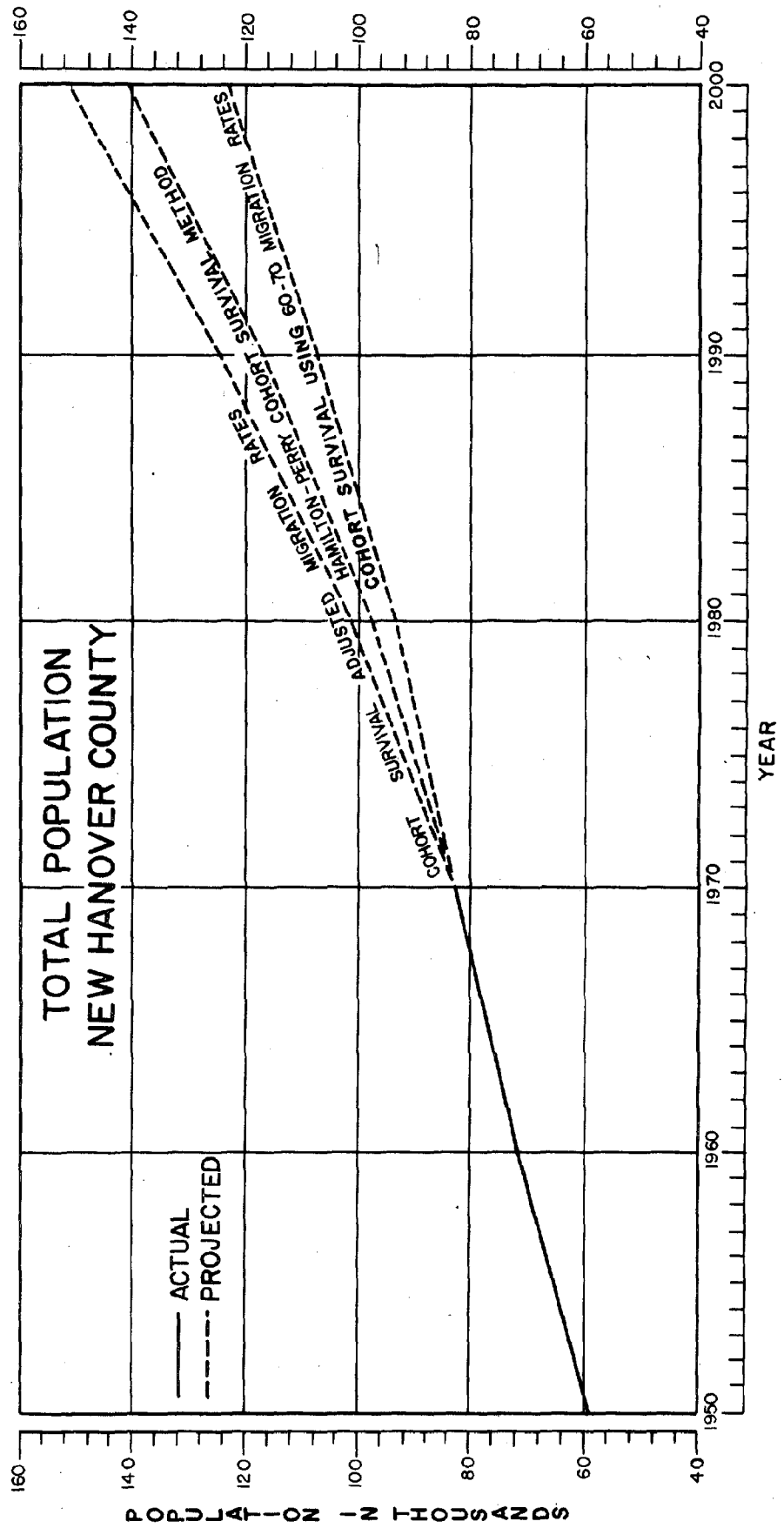
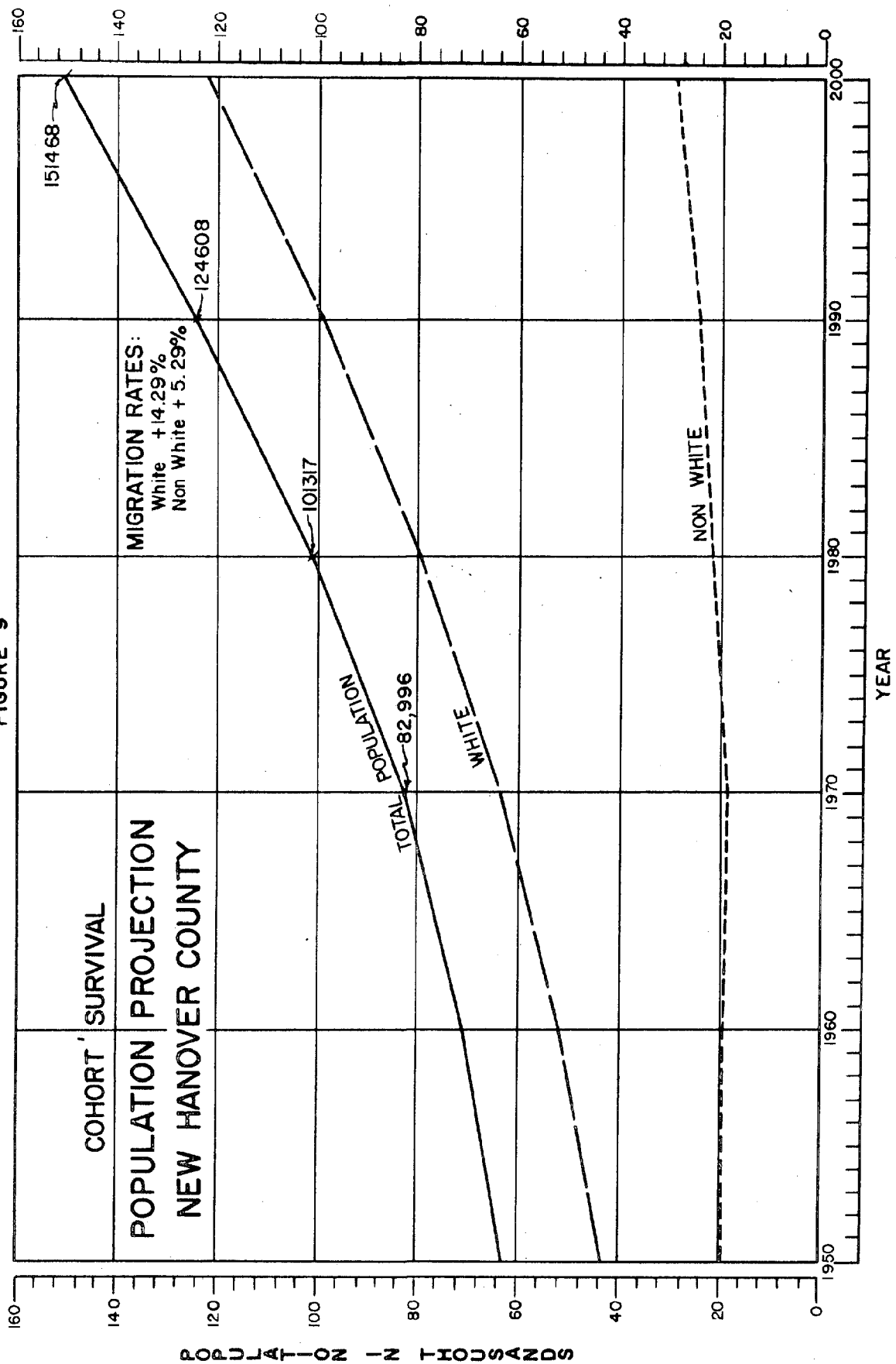


FIGURE 9



A. AGE PROJECTIONS

Age-specific population projections to the year 2000, based on the highest valued projection, are presented in Table 19, and the percentage age distribution to the year 2000 is illustrated in Figure 10. Table 19 offers a direct comparison of each five year age cohort to the horizon year. Figure 10, showing the relative relationship of each age cohort, clearly illustrates the lower birth rate and increased migration rate since 1970.

Age-sex-race population projections, based on the highest value projection, along with the 1970 actual composition are presented in the appendix. Age-sex-race percentage distribution projections are also illustrated in the appendix.

B. TOWNSHIP POPULATION PROJECTIONS

In order to arrive at population projections for the five townships of New Hanover County a simple regression, or "least-squares", method was employed. Inherent in the projection are any boundary changes which have occurred over the base period, specifically, annexations by the City and Township of Wilmington. The base data for arriving at the equation for each township were percent share of the total county population for the period 1930-1970. The percent share of each township was then projected in 10 year increments to the year 2000. The projected population of each township was then derived by applying the projected percentage of total county population from the highest valued cohort-survival projection.

Projected township populations along with estimates for January, 1975 are presented in Table 20. Differences between the township totals and the New Hanover County total discussed earlier are due to rounding.

TABLE 20

NEW HANOVER COUNTY TOWNSHIP POPULATION PROJECTIONS LEAST-SQUARES METHOD

TOWNSHIP	JAN. 1975	1980	1990	2000
Wilmington	50,400	53,080	59,400	64,870
Cape Fear	6,720	7,520	9,540	11,930
Federal Point	5,940	7,070	9,990	13,680
Harnett	19,950	22,980	30,780	40,330
Masonboro	8,970	10,610	14,830	20,130
Total	91,980	101,260	124,540	150,940

Source: Wilmington-New Hanover Planning Department

Projections for New Hanover County and the City of Wilmington are graphically illustrated in Figure 11.

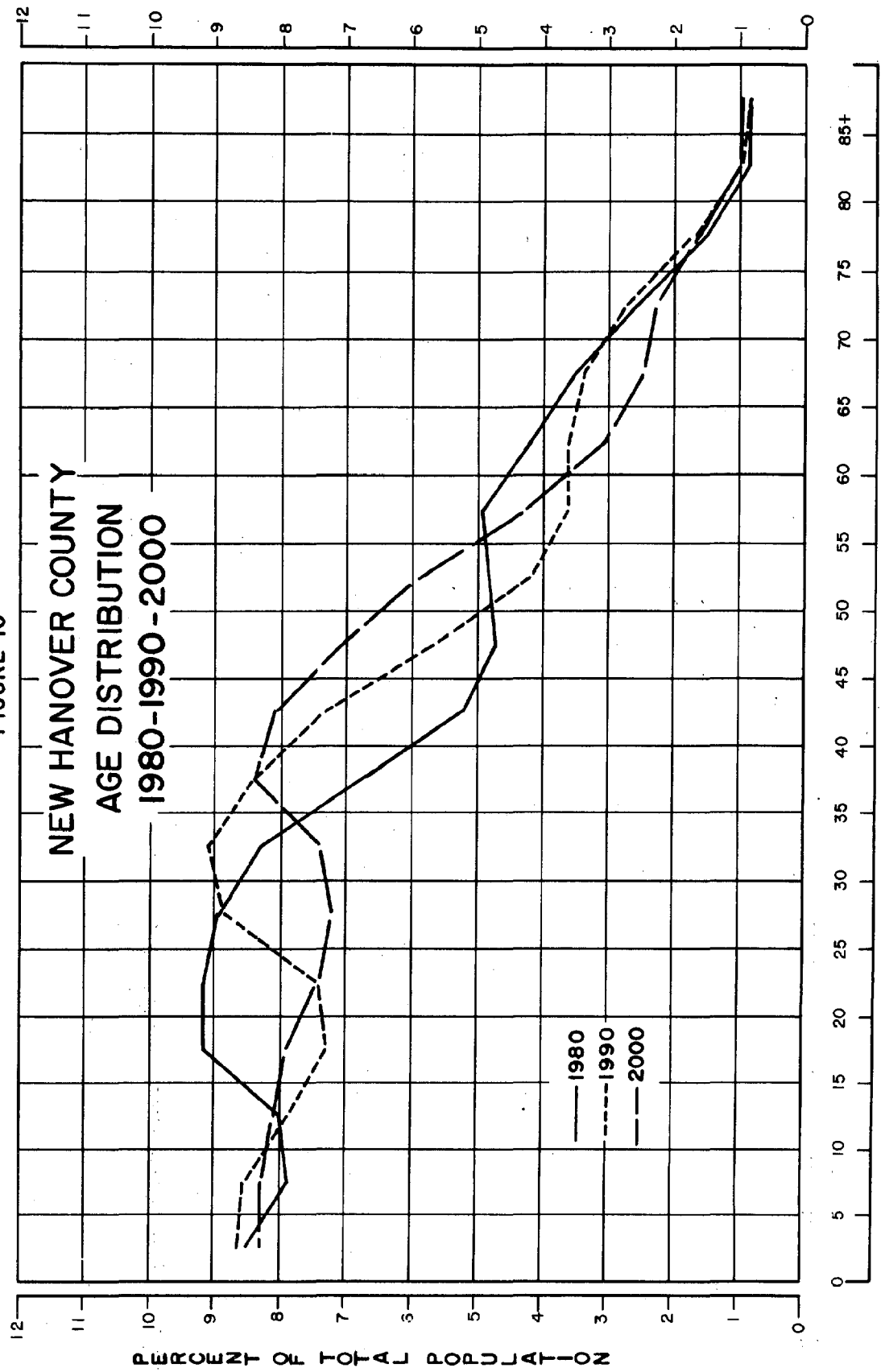
TABLE 19

AGE-SPECIFIC POPULATION PROJECTIONS
NEW HANOVER COUNTY
1970 - 2000

Age Groups	1970		1980		1990		2000	
	Number	%	Number	%	Number	%	Number	%
0-4	7,117	8.6	8,652	8.5	10,750	8.6	12,509	8.2
5-9	8,229	9.9	8,054	7.9	10,666	8.5	12,593	8.3
10-14	8,254	9.9	8,076	8.0	9,817	7.9	12,201	8.1
15-19	7,731	9.3	9,277	9.1	9,080	7.3	12,027	7.9
20-24	6,828	8.2	9,349	9.2	9,207	7.4	11,176	7.4
25-29	5,940	7.2	9,158	9.0	11,115	8.9	10,967	7.2
30-34	4,859	5.9	8,413	8.3	11,407	9.1	11,289	7.5
35-39	4,648	5.6	6,836	6.7	10,474	8.4	12,745	8.4
40-44	4,942	6.0	5,224	5.2	9,054	7.3	12,224	8.1
45-49	5,270	6.3	4,754	4.7	7,004	5.6	10,707	7.1
50-54	4,686	5.6	4,908	4.8	5,182	4.2	8,988	5.9
55-59	4,161	5.0	4,951	4.9	4,456	3.6	6,551	4.3
60-64	3,366	4.1	4,263	4.2	4,496	3.6	4,753	3.1
65-69	2,629	3.2	3,526	3.5	4,210	3.4	3,791	2.5
70-74	1,938	2.3	2,666	2.6	3,365	2.7	3,560	2.4
75-79	1,202	1.4	1,550	1.5	2,073	1.7	2,492	1.6
80-84	683	0.8	901	0.9	1,240	1.0	1,552	1.0
85+	513	0.6	759	0.7	1,012	0.8	1,343	0.9
TOTAL	82,996		101,317		124,608		151,468	

FIGURE 10

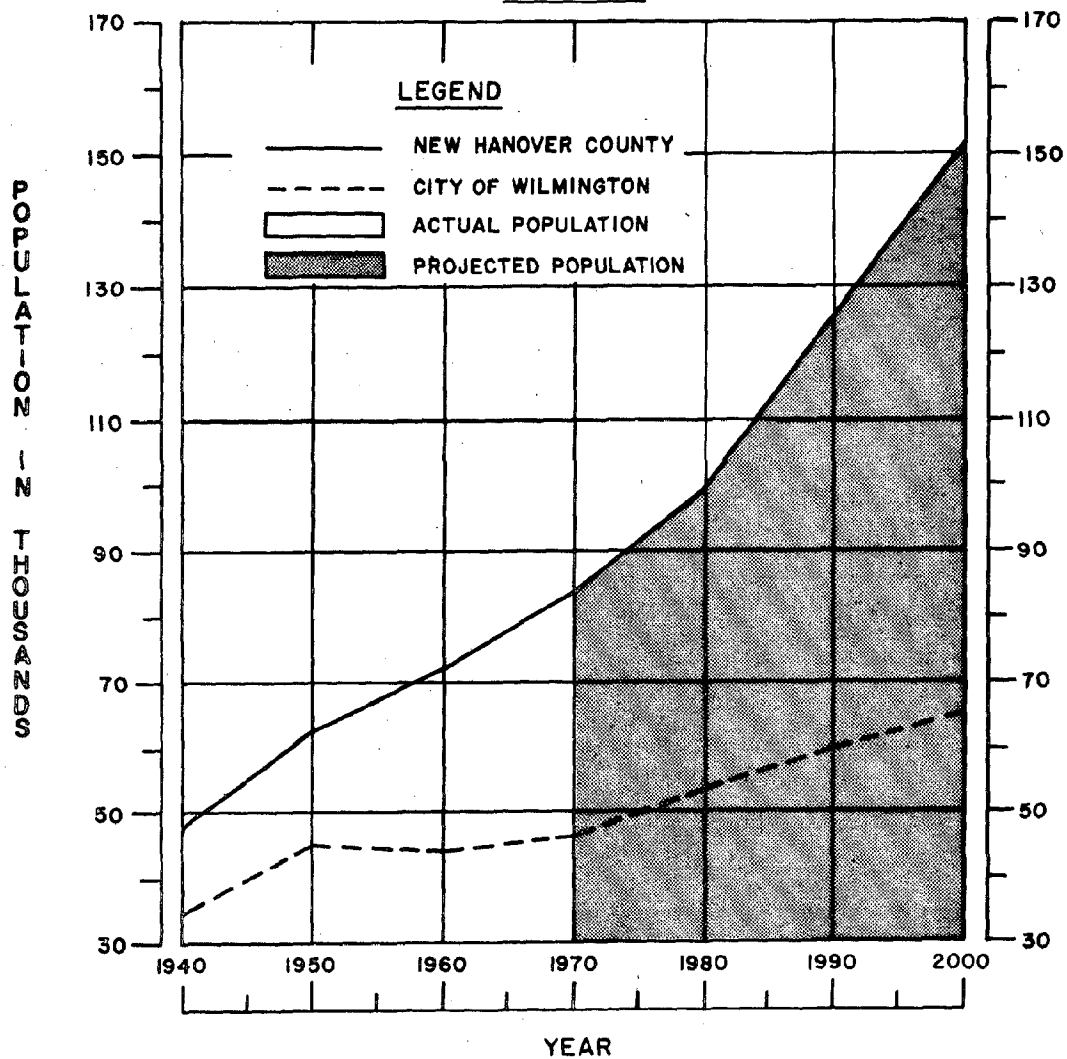
NEW HANOVER COUNTY AGE DISTRIBUTION 1980-1990-2000



SOURCE: WILMINGTON - NEW HANOVER COUNTY PLANNING DEPARTMENT

POPULATION GROWTH AND POPULATION PROJECTIONS
NEW HANOVER COUNTY AND THE CITY OF WILMINGTON
1940 - 2000

FIGURE II



APPENDIX A

TABLE 1

AGE-SEX-RACE COMPOSITION OF POPULATION

NEW HANOVER COUNTY

1970

Age Groups	White Male	White Female	Nonwhite Male	Nonwhite Female	Total
0-4	2,686	2,615	897	919	7,117
5-9	3,083	3,073	1,018	1,055	8,229
10-14	3,040	2,886	1,185	1,143	8,254
15-19	2,812	2,778	1,070	1,071	7,731
20-24	2,706	2,841	589	692	6,828
25-29	2,485	2,531	391	533	5,940
30-34	2,025	1,996	337	501	4,859
35-39	1,880	1,933	314	521	4,648
40-44	1,912	2,038	414	578	4,942
45-49	1,973	2,091	509	697	5,270
50-54	1,668	1,812	561	645	4,686
55-59	1,451	1,649	521	540	4,161
60-64	1,122	1,480	333	431	3,366
65-69	837	1,133	236	423	2,629
70-74	589	912	173	264	1,938
75-79	372	617	91	122	1,202
80-84	175	366	45	97	683
85+	119	265	48	81	513
TOTAL	30,935	33,016	8732	10,313	82,996

Source: U.S. Bureau of the Census, 1970 Census of Population

APPENDIX A
TABLE 2
1980 NEW HANOVER COUNTY POPULATION PROJECTIONS
HIGH RANGE AGE-SEX-RACE SPECIFIC POPULATION PROJECTIONS

NEW HANOVER COUNTY

1980

Age Groups	White Male	White Female	Nonwhite Male	Nonwhite Female	Total
0-4	3,285	3,119	1,129	1,119	8,652
5-9	3,185	3,031	924	914	8,054
10-14	3,085	2,994	988	1,009	8,076
15-19	3,410	3,575	1,100	1,192	9,277
20-24	3,507	3,508	1,061	1,273	9,349
25-29	3,665	3,628	878	987	9,158
30-34	3,494	3,547	642	730	8,413
35-39	2,991	2,888	381	576	6,836
40-44	2,271	2,117	347	489	5,224
45-49	1,923	2,012	308	511	4,754
50-54	1,864	2,053	427	564	4,908
55-59	1,763	2,030	501	657	4,951
60-64	1,461	1,804	465	533	4,263
65-69	1,118	1,510	389	509	3,526
70-74	807	1,271	236	352	2,666
75-79	438	796	105	211	1,550
80-84	207	494	58	142	901
85+	152	405	66	136	759
TOTAL	38,626	40,782	10,005	11,904	101,317

Source: Wilmington-New Hanover Planning Department

APPENDIX A
TABLE 3
1990 NEW HANOVER COUNTY POPULATION PROJECTION
HIGH-RANGE AGE-SEX-RACE SPECIFIC POPULATION PROJECTIONS

NEW HANOVER COUNTY

1990

Age Groups	White Male	White Female	Nonwhite Male	Nonwhite Female	Total
0-4	4,113	3,905	1,372	1,360	10,750
5-9	4,246	4,041	1,196	1,183	10,666
10-14	3,773	3,571	1,244	1,229	9,817
15-19	3,523	3,526	998	1,033	9,080
20-24	3,559	3,639	885	1,124	9,207
25-29	4,444	4,669	903	1,099	11,115
30-34	4,528	4,380	1,156	1,343	11,407
35-39	4,411	4,140	856	1,067	10,474
40-44	3,918	3,762	661	713	9,054
45-49	3,059	3,006	374	565	7,004
50-54	2,214	2,133	358	477	5,182
55-59	1,718	1,953	303	482	4,456
60-64	1,632	2,044	354	466	4,496
65-69	1,358	1,859	374	619	4,210
70-74	1,051	1,549	330	435	3,365
75-79	585	1,061	173	254	2,073
80-84	284	688	79	189	1,240
85+	179	522	76	235	1,012
TOTAL	48,595	50,448	11,692	13,873	124,608

APPENDIX A
TABLE 4
2000 NEW HANOVER COUNTY POPULATION PROJECTION

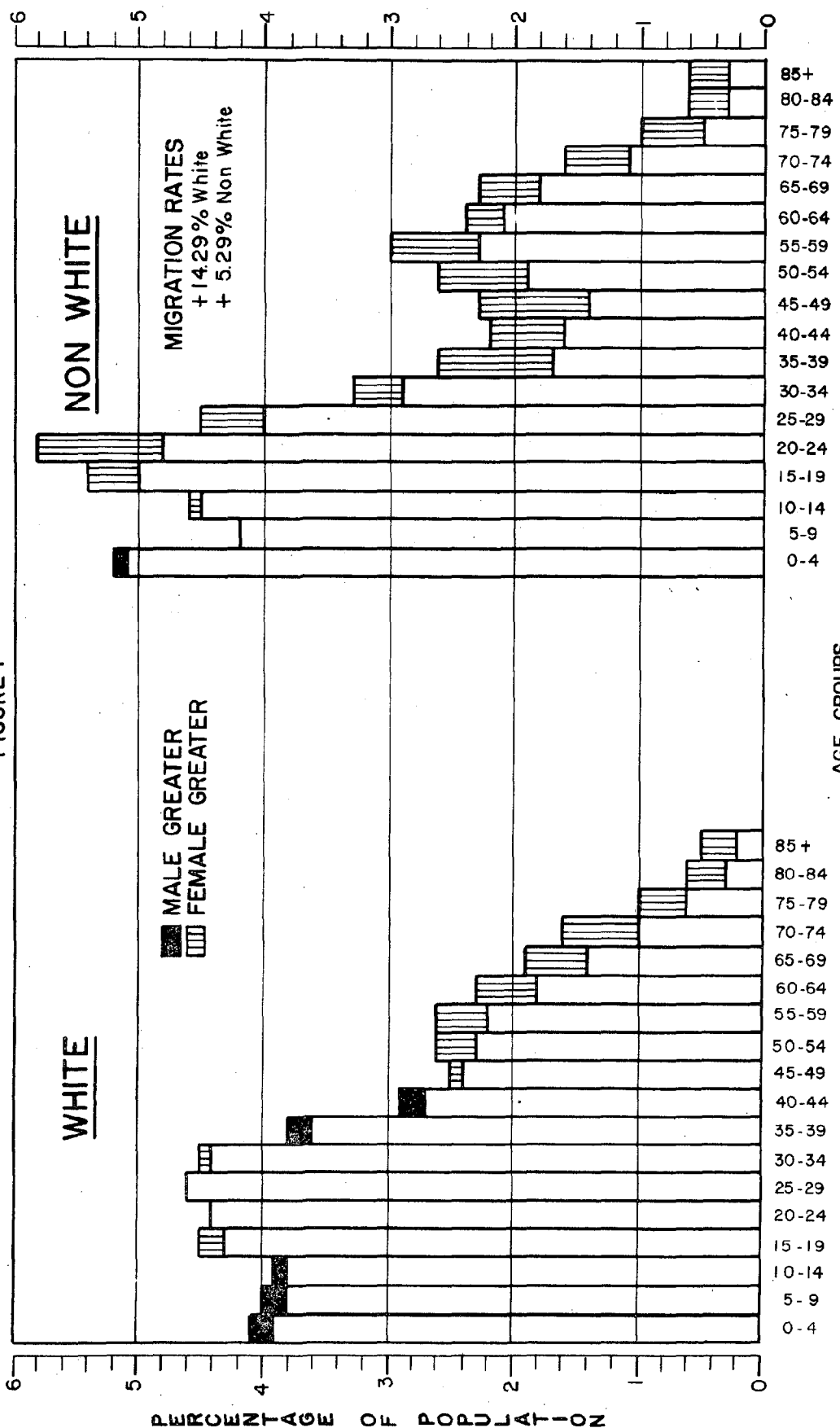
HIGH-RANGE AGE-SEX-RACE SPECIFIC POPULATION PROJECTIONS

NEW HANOVER COUNTY

2000

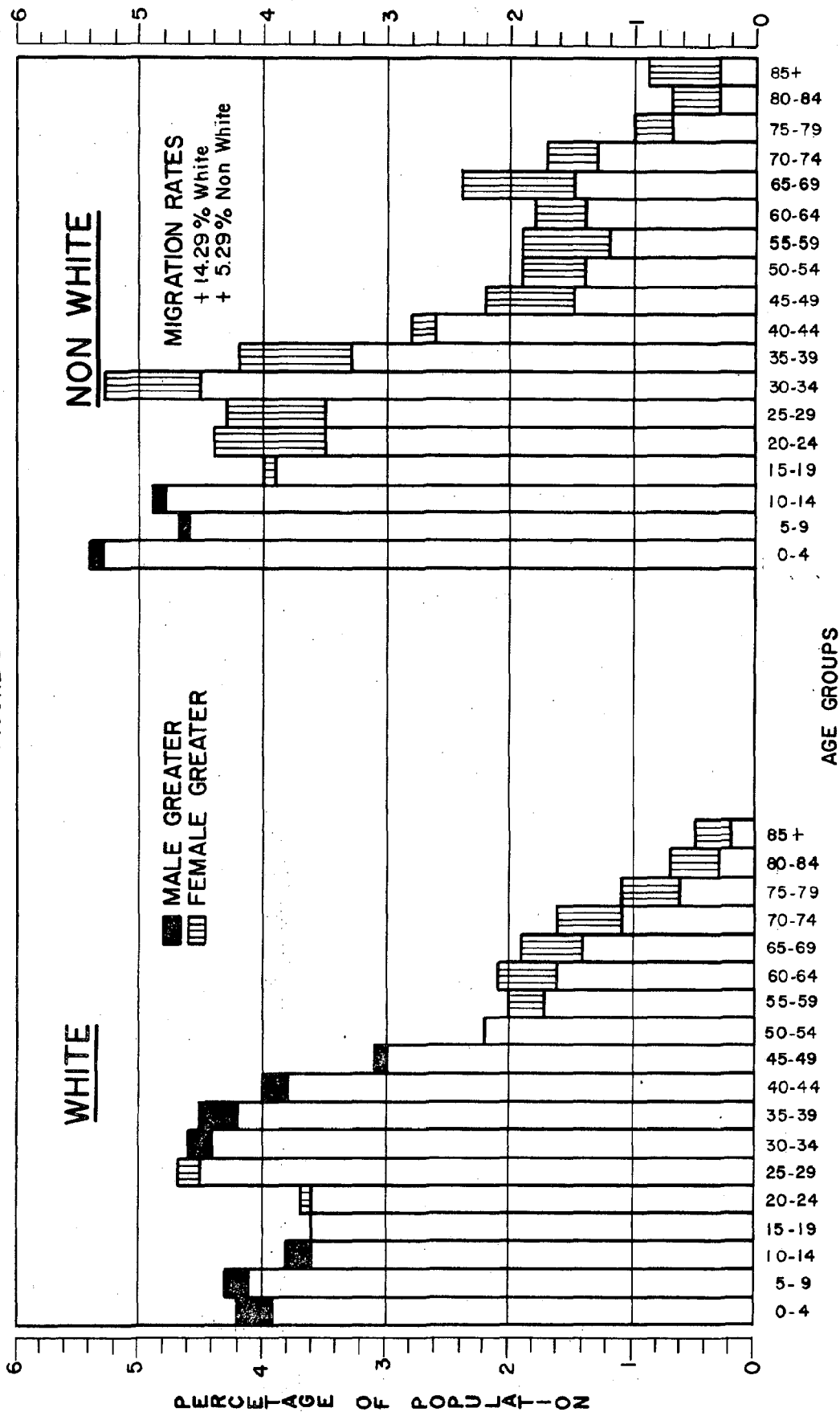
Age Groups	White Male	White Female	Nonwhite Male	Nonwhite Female	Total
0-4	4,803	4,560	1,580	1,566	12,509
5-9	4,997	4,756	1,428	1,412	12,593
10-14	4,724	4,471	1,512	1,494	12,201
15-19	4,697	4,701	1,292	1,337	12,027
20-24	4,353	4,340	1,114	1,369	11,176
25-29	4,591	4,605	819	952	10,967
30-34	4,595	4,544	964	1,186	11,289
35-39	5,349	5,328	880	1,188	12,745
40-44	5,077	4,645	1,190	1,312	12,224
45-49	4,511	4,309	840	1,047	10,707
50-54	3,820	3,790	682	696	8,988
55-59	2,733	2,917	368	533	6,551
60-64	1,938	2,124	297	394	4,753
65-69	1,323	1,788	226	454	3,791
70-74	1,174	1,755	251	380	3,560
75-79	711	1,306	166	309	2,492
80-84	370	838	110	234	1,552
85+	239	696	125	283	1,343
TOTAL	60,005	61,471	13,846	16,146	151,468

APPENDIX B
FIGURE I



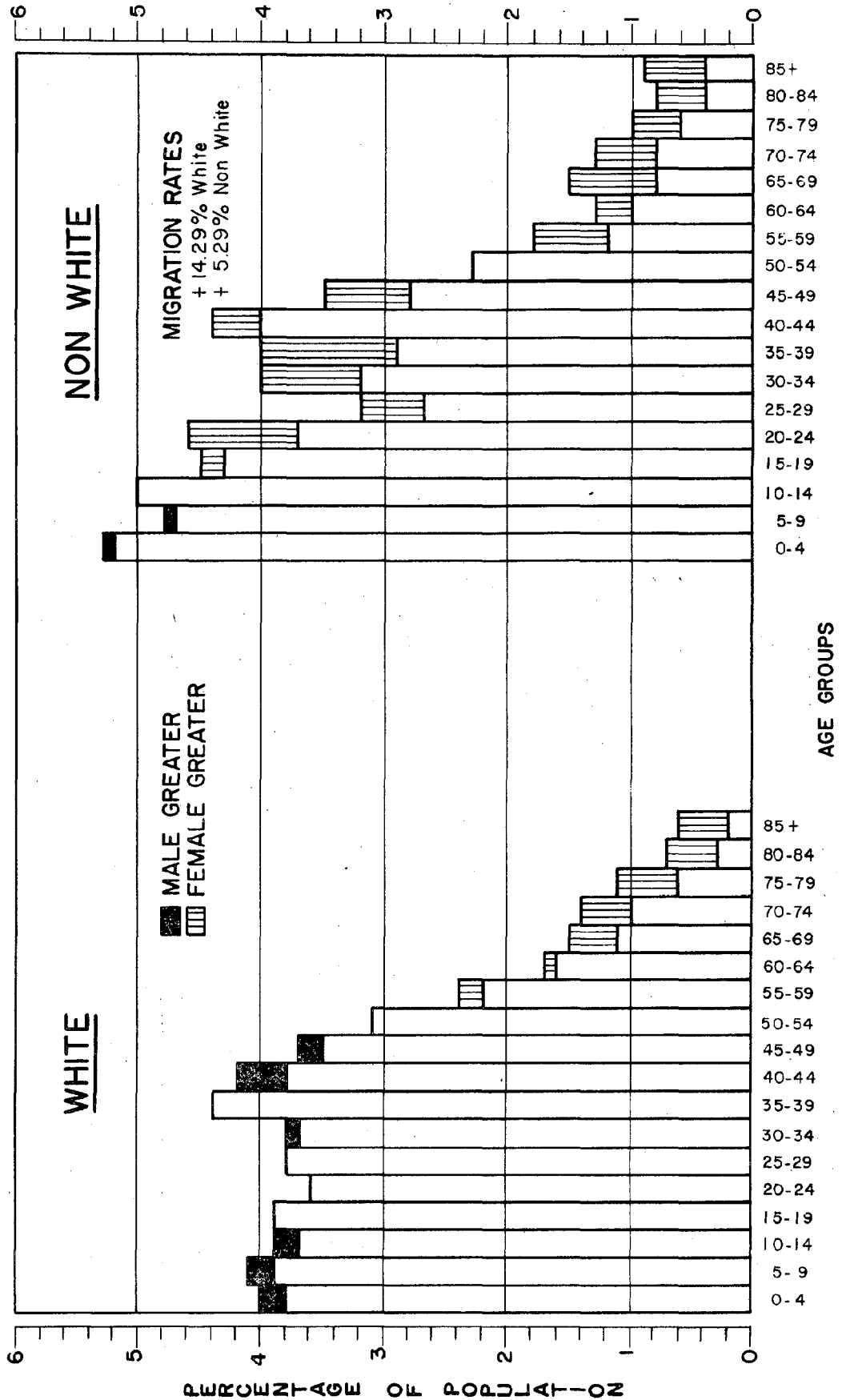
PROJECTED PERCENTAGE DISTRIBUTION: NEW HANOVER COUNTY
WHITE & NON WHITE: YEAR 1980

APPENDIX B
FIGURE 2



PROJECTED PERCENTAGE DISTRIBUTION: NEW HANOVER COUNTY
WHITE & NON WHITE: YEAR 1990

APPENDIX B
FIGURE 3



PROJECTED PERCENTAGE DISTRIBUTION: NEW HANOVER COUNTY
WHITE & NON WHITE: YEAR 2000

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SUMMARY OF ECONOMIC TRENDS AND EMPLOYMENT FORECASTS

Labor Force Characteristics

1. When compared to Southeastern North Carolina as a whole, participation of both males and females in New Hanover County's labor force is very high.
 - (a) In 1970, the male and female participation rates for the southeastern area were 73.3 and 40.5 respectively, while the county's rates were 81.8 and 48.8.
 - (b) While male participation rates remained constant between 1960 and 1970, female rates increased significantly, from 40.3 to 48.8.
2. Overall the county's work force is well-educated, with slightly more than one-half of the residents aged 25 years and over having completed high school and over 20 percent having completed some college. However, the statistics reveal a wide disparity between the formal education levels of white residents and nonwhites.
3. According to 1975 data, the Wilmington SMSA has the second lowest annual unemployment rate of all SMSA's in the state. Additionally, there appears to be no seasonal unemployment problem of unusual proportions in the county.
4. Between 1960 and 1970, commuters, as a percent of the total work force more than doubled (from 8.2 to 16.5 percent), reflecting the growing reliance of the county on a regional labor force and its importance as a source of jobs for residents of neighboring counties. It is expected that in-commuting will level off at about 20 percent of the total work force.
5. Surveys show that the county's recruitable labor area has a good supply of well-trained workers (approximately 3,400 available in September, 1974).
6. Work force data indicate that expansion of New Hanover County's economy has produced a substantial increase in the number of jobs. Between 1962 and 1972, the number of job opportunities in the county increased by 46 percent, from 28,500 to 41,500. During the same period, total population increased by only 17 percent, again confirming the county's position as a regional employment resource.

Income

1. Since 1965, New Hanover County's total personal income has been increasing rapidly. Measured in current dollars total income increased by 126 percent during that 8 year period.
2. Disposable income, as measured by "effective buying income," is also increasing rapidly. New Hanover County's total effective buying income increased by 90 percent between 1967 and 1973.
3. Projections of personal income per capita indicate a favorable trend for the county. It is projected that total personal income per capita will increase to approximately \$7,311 in the year 2000 as compared to \$3170 in 1970.

4. Increasing incomes can be attributed to increases in the number of residents employed in "new-type" and durable manufacturing sectors which are characterized by higher wages and salaries.
5. The retail trade sector has responded positively to rising incomes as evidenced by the expansion of existing establishments and the creation of new ones.

Industrial Profile

1. The role of agriculture in New Hanover County's economy, as measured by dollar volumes, is minor, and it appears that it will diminish further unless national factors such as scarce energy and the close proximity of the county to lucrative eastern markets produces an up-swing. This is not to minimize the importance of agriculture as a user of land.
2. Manufacturing
 - (a) Manufacturing is the major source of employment in New Hanover, employing over 25 percent of the county's total workers in 1972.
 - (b) Between 1962 and 1972, while the percentage of manufacturing employment to total work force remained relatively constant, a significant shift occurred from nondurables to durables employment. Durables employment is characterized by higher productivity and higher wages.
 - (c) In 1972, the weekly wage for workers in "new-type" industries (primarily durables) averaged \$181, as compared to \$100 and \$133 for "traditional" and "locally-oriented" industries.
3. Construction
 - (a) During the past decade the construction industry has been a major element in the local economy. For example, between 1966 and 1973 nearly 11,300 dwelling units were constructed in New Hanover County.
 - (b) City construction activity valuation as measured in constant dollars has remained relatively stable since 1966. In contrast, value of new construction in the county during this period has tripled.
4. Wholesale and Retail Trade
 - (a) The county's trade sector is second to manufacturing in terms of the employment of local residents. In 1972 approximately 20 percent of the county's total work force was employed in retail and wholesale trade.
 - (b) Between 1967 and 1972 the total value of New Hanover County's retail sales, in constant dollars, increased from \$132 million to \$199 million, or 51 percent.
 - (c) Leaders in retail sales volume in 1972 were food stores, automotive dealers, and general merchandise. These three groups accounted for over 57 percent of total county sales for that year.
 - (d) As measured by a buying power index of approximately 2, New Hanover County demonstrated a high retail trade potential.
 - (e) Wholesaling is an important facet of the county's economy. According to the latest available county level data (1972) the dollar volume of wholesale trade exceeded retail trade volume by more than 15 percent for that year.

5. Service Activities

- (a) The county has experienced considerable growth in service industry activity in recent years. In the five years between 1967 and 1972 total adjusted county sales increased by 45 percent.

Population and Employment Forecasts

1. Using the "low", "moderate", and "high" population projections developed in Part I of this report as a base, employment was projected for 1980, 1990 and the year 2000.
2. Because of the quality and timeliness of the data used in arriving at the "high" population projection it was selected as the population forecast for New Hanover County, and was used to derive an employment forecast.
3. Resident Employment Forecast

	1970	1980	1990	2000
Population	82,996	101,300	125,000	151,000
Percent in Labor Force	43.4	44.5	45.9	47.4
Labor Force	36,010	45,100	57,400	71,600
Percent Unemployed	3.3	5.0	5.0	5.0
Residents Employed	34,780	42,845	54,500	68,000

4. Also using the "high" population forecast employment by major industrial sector was projected to the year 2000.

Sector Work Force Employment Forecast*

	1970	1980	1990	2000
Total	38,210	47,500	60,500	73,950
Manufacture	9,830	12,400	16,100	19,400
Non-Manufacture	22,520	29,250	37,800	47,400
Construction	2,110	2,700	3,250	3,900
TCU	2,890	3,750	5,000	6,350
Trade	7,360	9,900	13,450	17,350
Fire	1,220	1,700	2,090	2,600
Service	4,190	5,200	6,700	8,400
Government	4,640	5,800	7,070	8,600
ONM	110	200	265	325
ONA	5,390	5,500	6,300	6,800
Agriculture	470	350	300	300

*Work force refers to the total number of workers employed in the county; work force includes residents and incommuters.

INTRODUCTION

OBJECTIVES AND ORGANIZATION

The analysis of New Hanover County's economy is a fundamental element in the Comprehensive Planning Process. The analysis has two major purposes: First, it complements the population analysis contained in Part I by providing more detailed information on the economic characteristics of the county's residents and by providing a basis for evaluating population projections in the preparation of forecasts of future growth^a; the second and equally important function of the economic analysis is to provide an economic information base from which to evaluate public policy alternatives and private decisions related to future growth -- land use, economic development, public service demands, and the related need for public facilities.

Therefore, this study will provide a comprehensive view of how New Hanover County's economy is organized and how it operates. It will address basic economic questions such as the following:

- What are the characteristics of the county's labor force?
- Where do workers employed in New Hanover County live?
- What are the county's sources of employment and income?
- Which industries are most important in the local economy?
- What are the prospects for growth?

DEFINITION OF LOCAL ECONOMY

In initiating any planning study, a basic requirement is a general understanding of the problems to be examined. Therefore, prior to organizing and defining the scope of the economic study, it was first necessary to develop a satisfactory working definition of the major elements of New Hanover County's economy and to approximate the extent of its economic influence.

Although economists have developed more complex definitions, in this study the local economic system has been viewed simply as a collection of people and industries (groups of firms producing similar products) which have common economic interests and which occupy a definable geographic area. By simplifying the concept of the local economy to include two major elements (people and firms having common economic interests) this definition provides a sound framework for analysis of the Planning Area's economy. This analysis examines these two components of the economy and provides a profile of the county's labor and its industries. In addition the study contains projections and forecasts of the county's economic growth, as measured by employment.

ORGANIZATION

The report is divided into three major parts. The first part focuses on the people (workers) in the Planning Areas's economy. It includes an

^aSee discussion of population forecasts on page 43.

analysis of labor and work force characteristics, commutation patterns, and income.

The second part of the report deals with industries (groups of firms producing similar products) in the local economy. The economy's major industries are examined basically from three perspectives: First, the historical importance of the industry in the development of the economy; second, the importance of the industry as a source of employment; and finally, the overall impact of that industry on the growth and development of the county's economy.

The final section of the report deals with the prospects for future economic growth through projections and forecasts of future employment. Economic growth is addressed both in terms of total employment and employment in each of the major industrial categories.

Taken as a whole, this report provides a detailed profile of the economy of New Hanover County. It provides a major portion of the economic data required to make sound decisions for the future. Its publication, however, should not be viewed as the final step in the process of economic analysis. Rather, it should be viewed as a first step, and the data and scope of the analyses included in the study should be continually up-dated, expanded, and revised to address the many questions raised by the study and to keep abreast of the county's ever-changing economic environment.

I. WORKER PROFILE

People are the basic component of New Hanover County's economy. They are the prime factors in both the production and consumption of the area's goods and services, and as such, the economic characteristics of the county's residents and its working force are major indicators of manpower problems and resources, as well as the potential for future economic expansion.

The primary purpose of this section is to develop a profile of the people included in the county's economic system. The first portion of the profile is directed toward an analysis of the area's economically active population which may be defined as those people who engage, in the production of goods and services. It includes an analysis of labor force and work force characteristics, an examination of commutation patterns, and an analysis of the major sources of income in the area. The second portion of the profile deals with New Hanover County residents as consumers, and it includes estimates of the county's total buying power and compares its commercial potential with other urban areas in the state.

A. DATA SOURCES

Employment data, the basis of the county's economic analysis, are available from several sources. However, each source has limitations when applied in a county's economic analysis. The two sources of employment data used most extensively in this report are census tabulations and North Carolina Employment Security Commission (ESC) data.

While the U.S. Census of Population is the more comprehensive and accurate data source, the census tabulations have a serious drawback -- employment data are collected by place of residence rather than by place of work. Thus, a Brunswick County resident employed in New Hanover County would be tabulated in Brunswick's employment.

North Carolina Employment Security Commission data are collected on the basis of place of work and more accurately reflect the geographic extent of the county's economic significance. The main disadvantage in using ESC data, however, is that estimates are based on a much smaller sampling and lack the statistical accuracy of census data.

The distinction between these two sets of data is important in the analysis of local economies because it permits the description of employment from two perspectives. For example, labor force data make it possible to examine employment from the standpoint of New Hanover County's residents to determine how many are employed or unemployed and the social characteristics of the county's economically active population. On the other hand, work force data have more validity in describing the economy of New Hanover County and in analyzing the extent to which the county serves as an employment resource for residents of areas outside the county.

These two complementary types of data provide a complete overview of the county's employment; therefore, both data sources have been utilized in the development of New Hanover County's economic profile.

B. LABOR FORCE PARTICIPATION

Labor force participation is the most common measure of a population's economic activity. Basically, there are two measures of participation: the crude activity rate and the age-sex-specific activity rate. The crude activity rate represents the number of economically active persons (employed or seeking employment) as a percent of the total population. Since the crude rate is very sensitive to the population's age structure, it is only indicative of the relative number of persons in a population who are employed irrespective of other factors which may be involved. For example, low labor force participation may be the result of a large number of retired persons in the population, but this factor would not be revealed by the crude rate. Therefore, the major utility of crude activity rates is limited to measuring the county's general level of economic activity and converting employment projections into total population projections.

For the analysis of manpower resources and assessment of the local economy's performance in relation to supplying employment opportunities for the county's residents, the age-sex-specific activity rate^a is a more useful measure of labor force participation. These rates are calculated for each sex, and they are a device for relating the actual number of persons participating in the labor force to the county's potentials as indicated by the total population in the economically active age group -- 16 to 65 years. As a standard of comparison, one would expect a very large percentage of males in the 16-65 age group to participate in the labor force.^b

New Hanover County's crude participation rates and age-sex-specific activity rates are found in Table 1. The crude rate showed a slight increase between 1960 and 1970, from 37.6 to 39.4. A major portion of this overall increase is attributable to more women in the labor force. The county's age-sex-specific rates indicate that participation of males in the labor force remained relatively constant between 1960 and 1970, with rates of 81.1 and 81.8 respectively. Participation by females, however, increased significantly from a rate of 44.3 in 1960 to 48.8 in 1970.

^aAge-sex-specific activity rates are calculated by the following formula:

$$\frac{\text{Total male (female) employment}}{\text{Total male (female) population in the 16-65 age group}} \times 100$$

^bShyrock, Henry S., Methods and Materials of Demography, U.S. Department of Commerce, Bureau of the Census, p. 367.

TABLE 1

NEW HANOVER COUNTY LABOR FORCE PARTICIPATION RATES: 1960 and 1970

Year	Population			Employment			Activity Rates		
	Total	Age 16 to 65		Total	Male	Female	Crude	Age-Sex-Specific	
		Male	Female					Male	Female
1960	71,742	19,749	22,396	26,975	16,638	10,337	37.6	81.1	44.3
1970	82,996	24,225	26,478	32,750	19,814	12,936	39.4	81.8	48.8

Source: Wilmington-New Hanover Planning Department; 1970 Census of Population

Using the total 1970 age-sex-specific activity rates for southeastern North Carolina^a counties as a standard of comparison, New Hanover County's participation rates appear to be exceptionally high. In 1970, the male and female rates for the southeastern area were 73.3 and 40.5, respectively, while the county's rates were 81.8 and 48.8. The county's high labor force participation rates are the product of many factors, but it appears that the following are the most significant among these:

1. The county's recent economic expansion has created expanded job opportunities for local residents. It appears that industrial expansions have capitalized on resident skills, thereby permitting the entry of a large portion of the county's residents into the labor force.
2. Entry of women into the labor force has had a significant effect on overall participation rates, and greater female participation can be traced to changing attitudes of women toward work outside the home and to expanded employment opportunities for women.

From this analysis, it appears that two trends are likely to occur in the future. First, the county's crude participation rate will likely continue to increase slowly as economic opportunities expand and the population becomes younger. Second, the participation of women in the labor force will probably continue to increase at a rapid rate; therefore, it is important that employment opportunities keep pace with this rising demand. The implications of female participation in the labor force are discussed in Part I.

C. EDUCATION

There is a high correlation between an area's economic potential and the educational attainment of its people. Formal education, labor force participation, job adaptability, and wages are closely related, and industries in search of locations for new facilities favor communities having an educated and skilled labor force and having technical and continuing education programs through which their employees may upgrade their skills.

^aIncludes the counties of Bladen, Brunswick, Carteret, Columbus, Duplin, Jones, New Hanover, Pamlico, and Pender.

Overall, New Hanover County is in a very competitive position from the standpoint of both programs and facilities for education and the educational attainment of its labor force. In addition to its public school system, the county has business and technical schools, and a four year liberal arts college. Cape Fear Technical Institute offers a variety of courses designed to meet the needs of local industry, and the Institute revises its curriculum to meet the changing needs of the community. The University of North Carolina at Wilmington offers continuing education courses in such fields as engineering and public affairs.

The county's public education programs have also been very effective. Of the 100 counties in North Carolina, the New Hanover County school system currently has the fifth lowest dropout rate (3.8 percent) for grades 1 through 12.^a In part, it is believed by educators that this low rate is due to special programs, such as evening courses and work-study programs, which permit flexibility in school attendance.

Although no direct measures of the educational attainment of the county's labor force are available, the educational characteristics of the county's 25 years and older population which are published in the Census of Population provide an approximation of the labor force's educational characteristics. These data have been used in Table 2 to develop an educational profile of New Hanover County residents.

Overall, the county's work force is well-educated, with slightly more than one-half of the residents aged 25 years and over having completed high school and over 20 percent having completed some college (see Figure 1). However, the statistics in Table 2 also reveal a wide disparity between the formal educational levels of white residents and nonwhites. Of the 9162 nonwhites in the 25 years and over age group in 1970, almost 75 percent had not graduated from high school; and further, slightly more than half of the persons in this age group had only an elementary education, or less.

The profile indicates that the educational background of New Hanover County's labor force is a significant contribution to the county's overall potential for economic development. At the same time, however, the county can never realize the full benefits of its labor resources as long as a significant segment remains under-educated. Therefore, education must remain a primary consideration in the development of the county's economy.

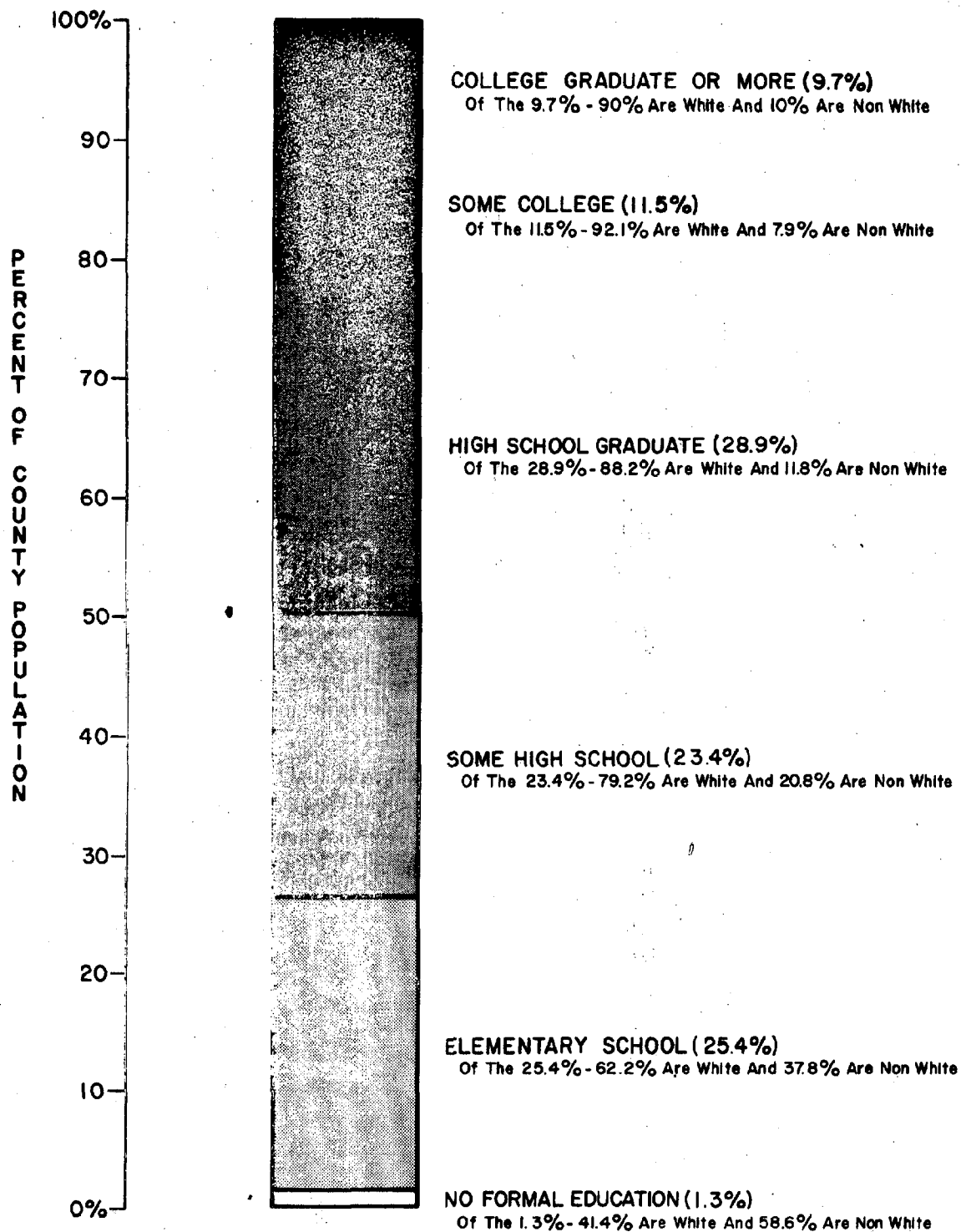
D. UNEMPLOYMENT

Unemployment has been defined as a measure of all persons who did not work at all during a reporting period but who were able, available, and looking for work, and it is a measure of the performance of the local economy in providing jobs as well as a measure of unemployed persons as a percent of the total civilian labor force.^b

^aSource: New Hanover County Board of Education.

^bEmployment Security Commission of North Carolina, "North Carolina Labor Force Estimates", November 1974.

FIGURE 1



**EDUCATIONAL ATTAINMENT OF NEW HANOVER COUNTY RESIDENTS
AGED 25 AND OVER BY RACE, 1970.**

SOURCE: 1970 CENSUS OF POPULATION, WILMINGTON-NEW HANOVER PLANNING DEPARTMENT

TABLE 2

EDUCATIONAL ATTAINMENT OF NEW HANOVER COUNTY RESIDENTS AGED 25 AND OVER, 1970

Educational Characteristic	All Residents				White Residents		Nonwhite Residents			
	Total		Male		Total		Total			
	No.	%	No.	%	No.	%	No.	%		
No Formal Education	561	1.3	260	46.3	301	53.7	232	41.4	329	58.6
Elementary School	11,372	25.4	5,567	49.0	5,805	51.0	7,079	62.2	4,293	37.8
Some High School	10,475	23.4	4,451	42.5	6,024	57.5	8,294	79.2	2,181	20.8
High School Graduate	12,934	28.9	5,641	43.6	7,293	56.4	11,410	88.2	1,524	11.8
Some College	5,139	11.5	2,296	44.7	2,843	56.3	4,735	92.1	404	7.9
College Graduate or More	4,328	9.7	2,350	54.3	1,978	45.7	3,897	90.0	431	10.0

Source: 1970 Census of Population

Average annual unemployment rates for New Hanover County compared favorably with those of the state in the years between 1970 and 1973.^a (See Table 3). According to the latest available Employment Security Commission data (January 1975), the Wilmington SMSA had the second lowest unemployment rate of the seven state SMSA's reported, 8.1 percent (See Table 4).

TABLE 3

NEW HANOVER COUNTY AND NORTH CAROLINA, UNEMPLOYMENT RATES: 1970-1973

Year	New Hanover County	North Carolina
1970	3.4%	4.3%
1971	4.3	4.8
1972	2.9	4.0
1973	2.3	3.5

Source: Employment Security Commission of North Carolina

TABLE 4

NORTH CAROLINA SMSA UNEMPLOYMENT RATES: JANUARY, 1975

North Carolina	10.4
Asheville	10.4
Burlington	10.9
Charlotte - Gastonia	9.5
Fayetteville	9.2
Greensboro - Winston Salem - High Point	8.3
Raleigh - Durham	5.1
Wilmington	8.1

Source: "Manpower Newsletter", North Carolina Employment Security Commission

E. COMMUTING PATTERNS

Commutation, or the travel of a worker to a county other than his place of residence for employment, has major implications for the Comprehensive Planning Process and for the county's overall economic development. First, and perhaps most important, is the relationship between an area's commutation patterns and the size of the labor pool from which new and existing economic activities can recruit employees. For example, a high rate of commutation

^aEmployment Security Commission data at the county level is normally not available until late in the following year. Therefore, data is not yet available for calendar year 1974 for the county.

indicates a willingness to travel for employment and is a rough measure of the geographic area from which employers might expect to draw employees. Similarly, commutation patterns also provide a measure of the geographic extent of New Hanover County's economic significance and is a measure of the extent to which the county serves as an employment resource for neighboring counties.

Finally, commutation affects employee spending patterns. While a worker may spend a portion of his salary in the area in which he works, a major share is normally spent on necessities such as food, rent, or mortgage payment at his place of residence, thus creating a "leakage" of money out of the economy. At the same time, however, it should be noted that the in-commuting employee does not demand the same level of public services and expenditures as the permanent resident. Regardless of the net economic effect of commuting workers, commutation patterns are a function of residential preferences, as well as job opportunities, and the established commuting patterns of current workers are difficult to modify to any great extent. Change in commutation patterns are affected primarily by either the location of new job opportunities or by in-migrant residential preferences.

The commuting patterns shown in Table 5, reflect the growing economic interdependence of New Hanover County and its neighboring counties. During the 1960-70 decade, the number of residents traveling outside the county for employment increased from 1518 to 2335. Similarly, the number of residents of neighboring counties employed in New Hanover increased from 2195 in 1960 to 6055 in 1970. The overall effect of these trends has been an increase in net commuting (in-commuters minus out-commuters) from 677 in 1960 to 3720 in 1970, or approximately 450 percent. The county's 1970 net commuting patterns are illustrated in Figure 2.

In both 1960 and 1970, Brunswick and Pender Counties were the major sources of New Hanover's in-commuters. In 1960, Brunswick furnished 945 commuters and Pender County furnished 613 commuters to New Hanover County. By 1970, the number of commuters from these counties had increased to 1837 and 1692 respectively. It is important to note that between 1960 and 1970 the number of commuters from Brunswick County as a percent of the total decreased sharply. At the same time, out-commuting from New Hanover County to Brunswick has increased significantly. In 1960, 381 New Hanover residents were employed in Brunswick. In 1970, the number of out-commuters to Brunswick County had increased to 1154 -- more than 300 percent.

The trends in commutation between New Hanover and Brunswick Counties are clearly the result of recent expansion of employment opportunities in Brunswick. It is impossible to determine whether commuters to Brunswick County are "established" New Hanover residents or whether they are "new" residents who have moved to the area specifically as a result of employment in Brunswick County. However, given existing amenities in New Hanover County, including the level of public and private community services and facilities and more extensive shopping opportunities, it is reasonable to expect that a large percentage of the Brunswick commuters are new residents who have located in New Hanover County as a result of its residential preferences. The economic questions associated with providing services to residents without having the advantages of the associated industrial tax base will be explored in a subsequent study of county costs and revenues.

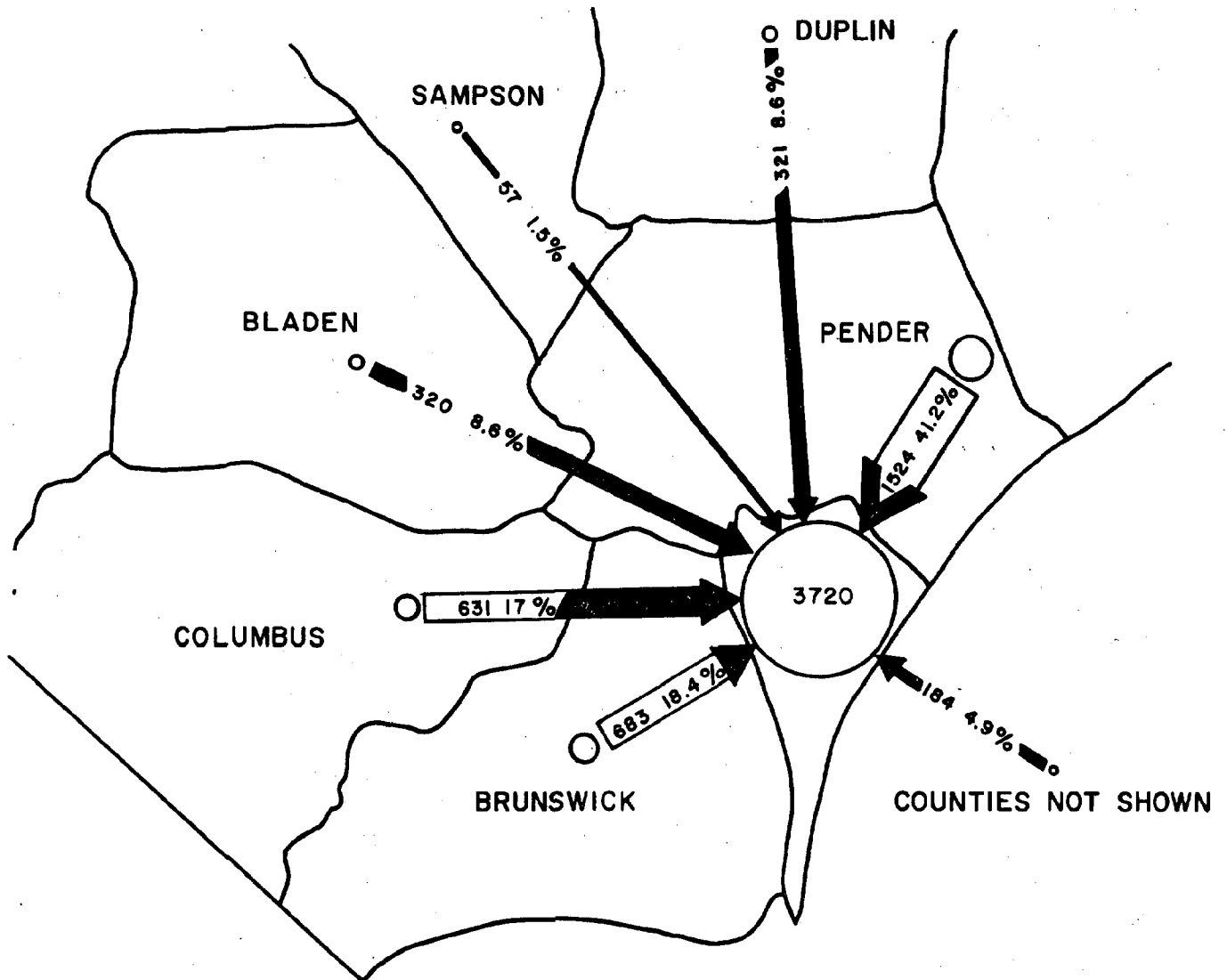
TABLE 5

COMMUTING PATTERNS FOR NEW HANOVER COUNTY
1960-1970

COUNTY	1960			1970		
	OUT- COMMUTING	%	IN- COMMUTING	OUT- COMMUTING	%	IN- COMMUTING
Bladen	10	0.7	60	7	0.3	327
Brunswick	381	25.1	943	1154	49.4	1837
Columbus	277	18.2	210	194	8.3	825
Duplin	26	1.7	26	23	1.0	344
Pender	129	8.5	613	168	7.2	1692
Sampson	15	1.0	32	0	0	57
Elsewhere	680	44.8	311	789	33.8	973
Total	1518	100	2195	2335	100	6055
Net Commuting Gain	+677			+3,720		

Source: North Carolina Commuting Patterns: 1960 and 1970; Employment Security Commission of North Carolina, developed from ESC data and unpublished census data.

FIGURE 2
NET COMMUTING PATTERN
NEW HANOVER COUNTY
1970



SOURCE: North Carolina Commuting Patterns: 1960 & 1970
 Employment Security Commission of North
 Carolina, developed from ESC data and
 unpublished census data.

The county's commuting patterns also emphasize the importance of New Hanover as an employment resource in the Southeastern North Carolina area.

F. RECRUITABLE LABOR FORCE

Recruitable labor force and labor force recruiting area are concepts closely associated with commuting patterns, and they are one of the factors considered in a new industry's decision to locate in the area. The labor force recruiting area is generally determined by driving time and distance (25 miles and 30 to 40 minutes for Wilmington). The recruitable labor force within the labor area is normally measured by the number of active ESC job applicants.

Using Wilmington as the center point, New Hanover County's labor force recruiting area is illustrated in Figure 3. The number of active job applicants, according to September 1974 ESC data, are listed in Table 6. These data show that the county has not only a significant potential labor supply but also that its labor supply is well-trained. Of the 3,365 registered job applicants, almost 90 percent have substantial work experience (Table 7 provides a profile of the labor supply by occupational classification).

From this analysis of commuting patterns and labor force recruitment, it is evident that the availability of labor is not at this time a limiting factor in the development of New Hanover County's economy.

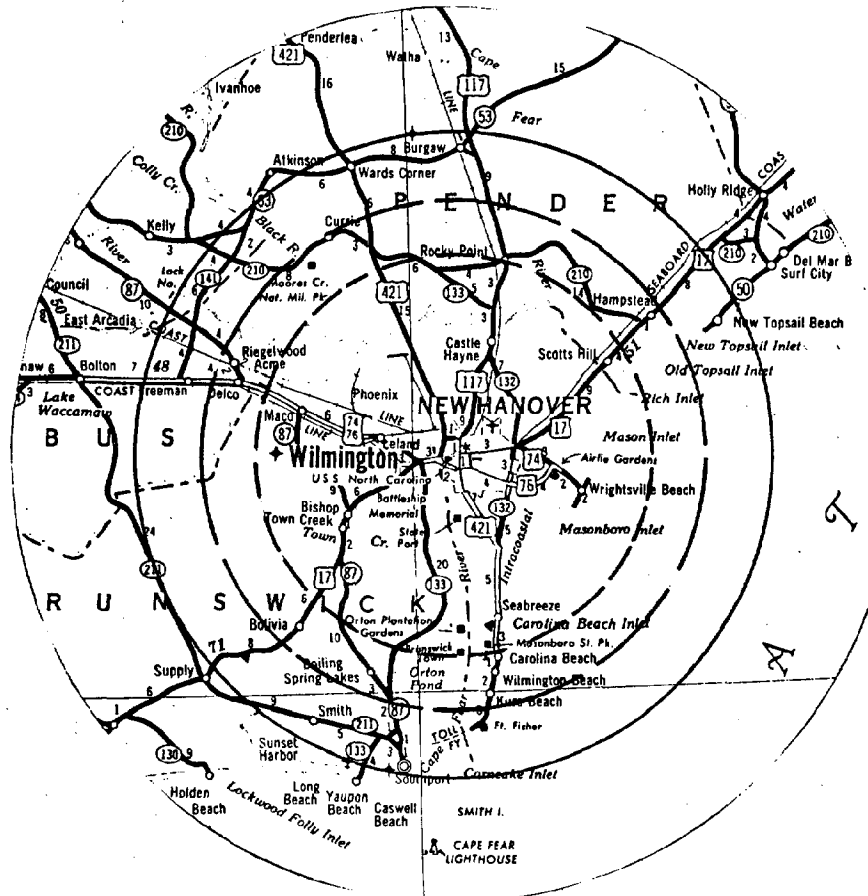
TABLE 6

NUMBER OF REGISTERED JOB APPLICANTS RESIDING WITHIN
THE WILMINGTON LABOR RECRUITING AREA: SEPTEMBER, 1974

Miles	Persons Registered			With Substantial Work Experience		With Limited or No Work Experience	
	Total	Male	Female	Male	Female	Male	Female
0-15	2,695	1,375	1,320	1,260	1,140	115	180
15-20	280	135	145	125	135	10	10
20-25	390	180	210	170	195	10	15
Total	3,365	1,690	1,675	1,555	1,470	135	205

Source: Employment Security Commission of North Carolina

FIGURE 3
LABOR FORCE RECRUITING AREA
NEW HANOVER COUNTY



SOURCE: Employment Security Commission of
North Carolina.

TABLE 7
MAJOR OCCUPATIONAL CLASS OF JOB APPLICANTS
SEPTEMBER, 1974

	Male	Female	Total
Professional, Technical, and Managerial	130	90	220
Clerical and Sales	140	445	585
Service	90	355	445
Farming, Fishing, and Forestry	25	45	70
Processing	30	30	60
Machine Trades	130	70	200
Bench Work	45	175	220
Structural Work	440	20	460
Miscellaneous Occupations	240	75	315
Partials ^a	420	370	790
Total	1,690	1,675	3,365

Source: Employment Security Commission of North Carolina

^aPartials are defined as persons registered for work but whose applications had not been assigned an occupational class

G. WORK FORCE CHARACTERISTICS

As discussed previously (page 4), the work force concept provides a different, but significant, perspective on local employment. In contrast to labor force data which are collected from individuals and provide employment information by place of residence, work force data are collected from establishments and provide a measure of employment by place of work. Therefore, work force estimates furnish a measure of the actual number and types of jobs provided in New Hanover County.

New Hanover County's work force estimates for 1962, 1967, and 1972, which are summarized in Table 8, indicate a substantial increase in the number of jobs provided by the local economy. In 1962, firms in New Hanover County provided an estimated 28,500 jobs, and by 1972, the number of jobs had increased to approximately 41,500, an increase of almost 46 percent.

In addition, Table 8 shows that the number of jobs in the county is also increasing faster than the population. While the work force increased by 46 percent between 1962 and 1972, the county's total population increased by only 17 percent during the same period. Further, the county's work force as a percent of total population also increased significantly. For example, in 1962 the work force was approximately 39 percent of the population, and in 1972 it had increased to 48 percent of the total population.

These trends verify earlier conclusions concerning the county's position as a regional employment resource. Not only is the county providing adequate job opportunities for its indigenous population and a large number of migrants, it also provides a large number of jobs for residents of surrounding counties.

TABLE 8

NEW HANOVER COUNTY WORK FORCE AND SIZE OF POPULATION: 1962, 1967 and 1972

	Year			Percentage Change		
	1962	1967	1972	1962-1967	1967-1972	1962-1972
Estimated Total Population	73,640	77,883	86,600	5.7%	11.2%	17%
Civilian Work Force (Number of Jobs)	28,480	34,210	41,510	20.1	21.3	45.7

Source: Employment Security Commission of North Carolina, 1960 and 1970 Censuses of Population, and Wilmington-New Hanover Planning Department.

Table 9 provides an overview of the types of jobs found in New Hanover County. As expected, manufacturing is the most important source of jobs, accounting for slightly more than 25 percent of all employment in 1972. Within the manufacturing classification, it is important to note the changing distribution of jobs between durables and non-durables. In 1962, approximately 73 percent of all manufacturing employment was in the production of nondurable materials. By 1972, the share of non-durables employment had decreased to only 53 percent. This change in the durables - nondurables employment mix is a key factor in the county's rising incomes, since traditionally durables employment yields higher wages than non-durables (a detailed discussion of this relationship is found on page 18.)

Trade is the second most important source of employment with approximately 20 percent of the county's jobs in 1972. Government is the third leading employment sector accounting for approximately 12 percent of the total. Considering the ten year trend illustrated in Table 9, it appears that employment in both of these sectors has remained steady as a percentage of total county employment.

Agriculture has not been significant in the county's economy with respect to employment for some time, and its share of total employment is continuing to decline. Between 1962 and 1972, agricultural employment declined by more than 40 percent -- from 760 to 450.

The distribution of county employment among major sectors of the economy is illustrated in Figure 4.

H. INCOME

Analysis of income is a fundamental element of basic comprehensive planning studies. It serves both as a social indicator which measures the economic well-being of the planning area's residents and as an economic indicator which measures the quality of the planning area's employment opportunities and its potential for consumer-oriented business activity. Since the social implications of the Planning Area's income characteristics were discussed in detail in Part I, the major focus of this section is the implications of income for the local economy. Specifically, two income measures will be discussed. The first, total personal income, is an indicator of the area's overall growth or decline and provides a basis for analyzing the sources of income for the residents of the planning area. The second measure is effective buying income, or disposable income, which is an indicator of the resident's access to consumer goods and is also a measure of the area's commercial potential. Together, these measures can provide a balanced analysis of the Planning Area's income characteristics.

1) Income Statistics

The decennial census is the most reliable source of income statistics for planning purposes; however, use of census statistics in the analysis of income characteristics has two disadvantages:

TABLE 9

NEW HANOVER COUNTY ANNUAL WORK FORCE ESTIMATES:

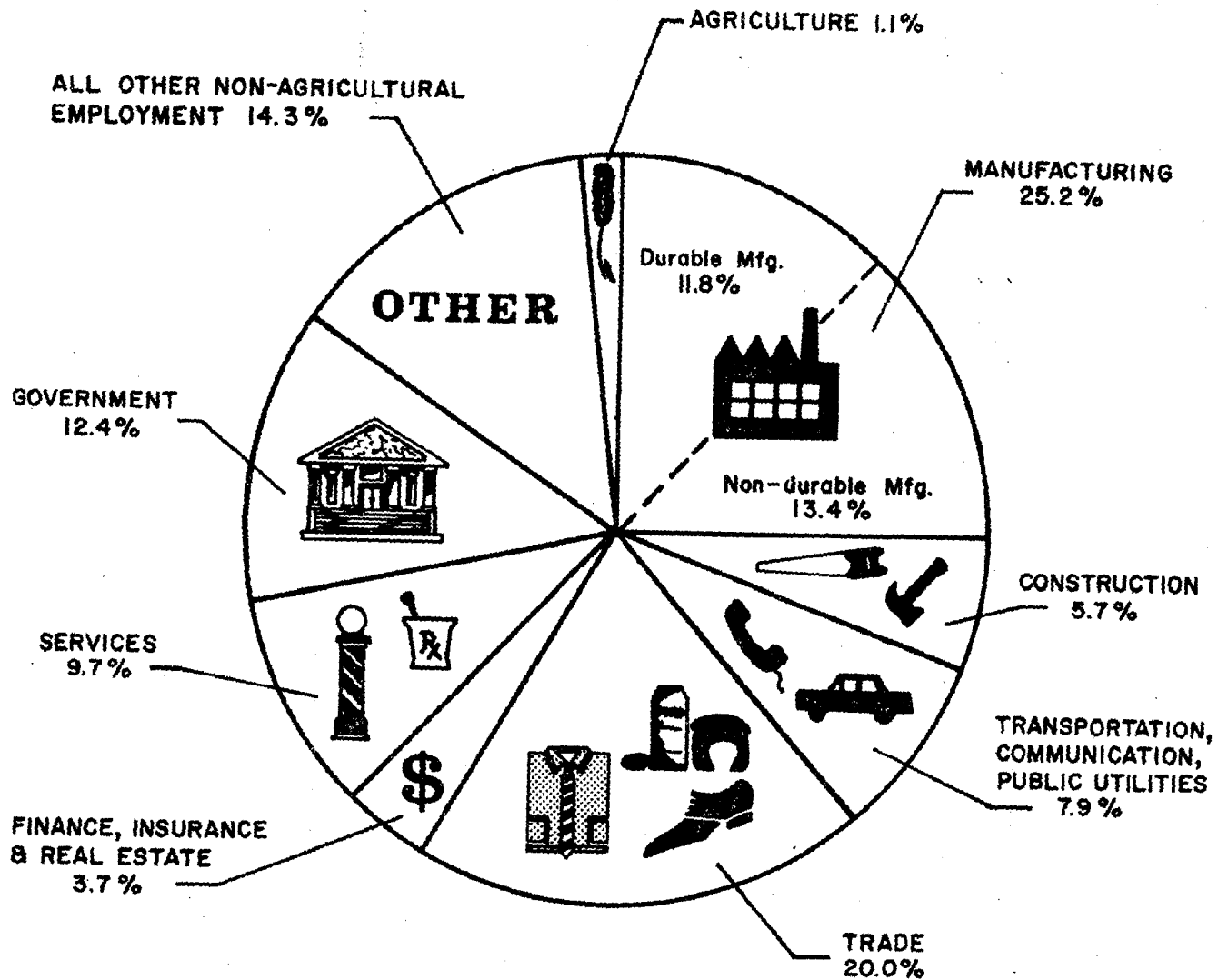
1962, 1967 and 1972

	1962		1967		1972	
	Number	%	Number	%	Number	%
Civilian Work Force	28,480	-	34,210	-	41,510	-
Unemployment, Total	1,860	6.5%	1,430	4.2%	1,140	2.7%
Employment, Total	26,620	93.5	32,780	95.8	40,370	97.3
Manufacturing	6,400	24.0	7,880	24.0	10,160	25.2
Durable	1,730	6.5	2,930	8.9	4,760	11.8
Non-durable	4,670	17.5	4,950	15.1	5,400	13.4
Construction	1,160	4.4	1,840	5.6	2,280	5.7
Transportation, Communication, and Public Utilities	1,920	7.2	2,710	8.3	3,200	7.9
Trade	4,990	18.7	5,870	17.9	8,090	20.0
Finance, Insurance, and Real Estate	1,010	3.8	1,040	3.2	1,510	3.7
Service	2,740	10.3	3,560	10.9	3,930	9.7
Government	3,050	11.5	4,030	12.3	5,010	12.4
Agriculture	760	2.8	570	1.7	450	1.1
Other	4,590	17.3	5,280	16.1	5,740	14.3

Source: Employment Security Commission of North Carolina and the Wilmington-New Hanover Planning Department.

FIGURE 4

EMPLOYMENT BY SECTOR, 1972



1. Census data are seldom current. The most recent information currently available is five years old, and its use will not reflect significant recent changes in the Planning Area's income characteristics.
2. The Census reports gross income rather than actual net cash income available for the purchase of goods and services.

Complementary data to overcome this shortcoming has been obtained from Sales Management magazine's "Survey of Buying Power" and the U.S. Department of Commerce's "Survey of Current Business". Sales Management magazine's "Survey of Buying Power" reports data through 1973 and the "Survey of Current Business" reports data through 1972.

2) TOTAL PERSONAL INCOME

Total personal income is defined as all income from land, labor, and capital before the deduction of federal, state and local taxes. Analysis of past trends in total personal income reveals the degree of economic well-being and dynamics of an area such as decline, stability, or growth.

Figure 5 illustrates past trends in total personal income for the Wilmington SMSA in both constant and current dollars and reveals two distinct growth periods between 1950 and 1972. The first period, from 1950 to 1965, was one of relatively slow growth; the second period, 1965 to 1972, was one of much greater growth. During the 15 years between 1950 to 1965 total personal income in current dollars increased by approximately 112 percent. In the next seven years, or approximately half the previous time period, total personal income increased by over 126 percent. After converting the data to constant 1967 dollars to discount the effects of inflation, the growth rates for these two periods are 62 percent and 71 percent, respectively, indicating that even with growing inflation incomes are still increasing.

In addition to the trends revealed in Figure 5, the total personal income growth of the Wilmington SMSA has been compared with that of four other North Carolina SMSA's -- Burlington, Asheville, Fayetteville, and Raleigh-Durham. Although total personal income is primarily a reflection of population size, it can be seen in Figure 6 that in the period from 1965 to 1972 income in the Wilmington SMSA exceeded that of the Burlington SMSA, which has approximately the same size population.

3) EFFECTIVE BUYING INCOME

Effective buying income (EBI) is total personal income -- wages, salaries, interest dividends, property income, and transfer payments -- minus federal, state, and local taxes. It represents disposable income or income which residents can actually spend, save, or invest.

Table 10, which is illustrated graphically by Figure 7, presents effective buying income for three urban North Carolina counties (New Hanover,

FIGURE 5
TOTAL PERSONAL INCOME
BY RESIDENTS
WILMINGTON SMSA
1950 to 1972

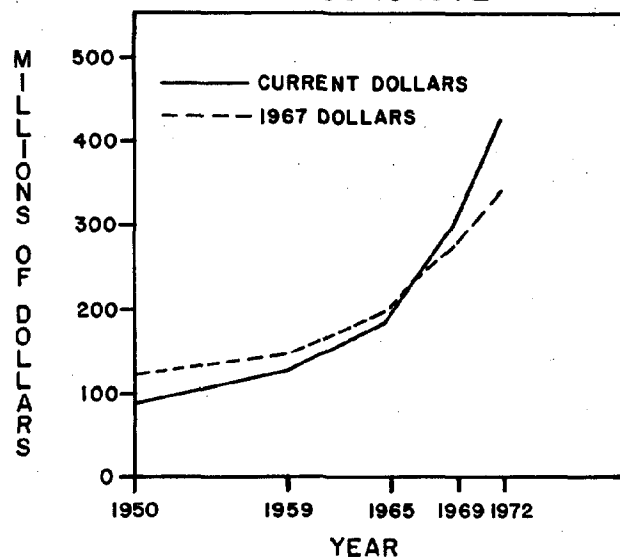


FIGURE 6
TOTAL PERSONAL INCOME
BY RESIDENTS
SELECTED SMSA'S
(CURRENT DOLLARS)

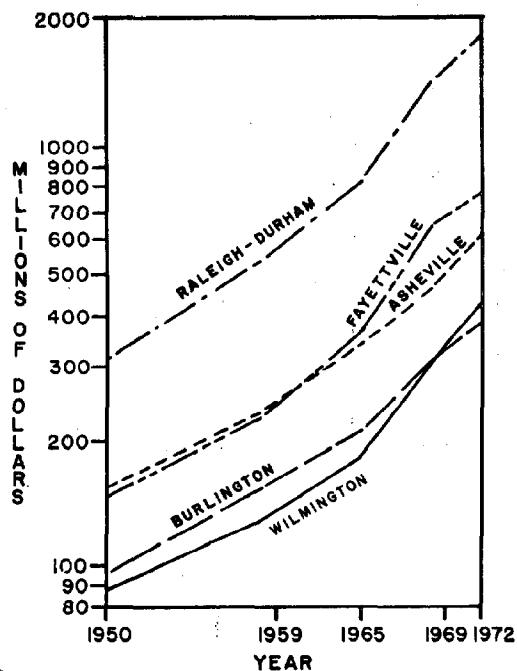
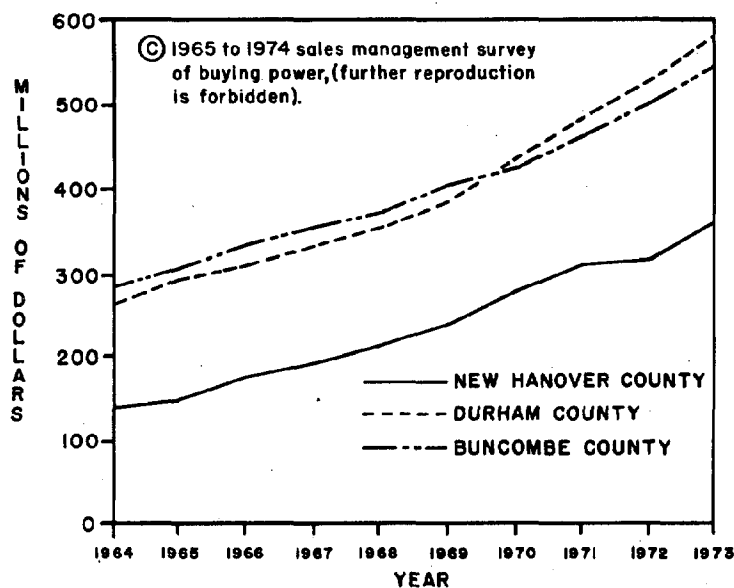


FIGURE 7
EFFECTIVE BUYING INCOME
NEW HANOVER, DURHAM & BUNCOMBE COUNTIES
1964 THROUGH 1973
(CURRENT DOLLARS)



SOURCE: Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis, May, 1972.

Durham, and Buncombe) located within the three geographical provinces of the state -- Coastal Plain, Piedmont, and Mountain.

New Hanover County's total EBI nearly doubled during the period 1967-1973 with a growth rate of 90 percent. This greatly surpassed the two other representative urban counties. The total EBI represents the potential market for consumer items; therefore, it is a useful tool for retail enterprises desiring to locate additional outlets.

TABLE 10
EFFECTIVE BUYING INCOME
NEW HANOVER, DURHAM, AND BUNCOMBE COUNTIES: 1967, 1970, and 1973
(Current Dollars)

County	Effective Buying Income (Thousands of dollars)			Percentage Change		
	1967	1970	1973	1967-1970	1970-1973	1967-1973
New Hanover	190,313	278,895	362,056	46.5	29.8	90.2
Durham	333,194	437,265	585,107	31.2	33.8	75.6
Buncombe	357,559	429,299	549,266	20.1	27.9	53.6

Source: Sales Management Survey of Buying Power; further reproduction is forbidden.

4) EBI PER HOUSEHOLD

In order to more accurately compare effective buying incomes among different counties it is desirable to discount the effects of population differences since total effective buying income is largely a reflection of population size. This is accomplished by the use of effective buying income per household. EBI per household represents the disposable income earned by each household. In this sense, effective buying income per household more accurately reflects the purchasing power of the county's residents and the overall economic retail potential of the county than does total effective buying income.

Table 11, which is illustrated graphically by Figure 8, presents effective buying income per household. Although a slight decline in EBI per household between 1971 and 1972 caused a decline in the county's overall growth rate from 1967 to 1973, from 1967 to 1973 the county's growth rate greatly exceeded the rates for Durham and Buncombe Counties. In 1967 Durham County's EBI per household was approximately \$1,400 greater than New Hanover's, but by 1973 this difference was nearly halved to a difference of only \$771. During this same period, New Hanover County's effective buying income per household grew from approximately \$250 less to more than \$1,150 greater than that of Buncombe County.

TABLE 11

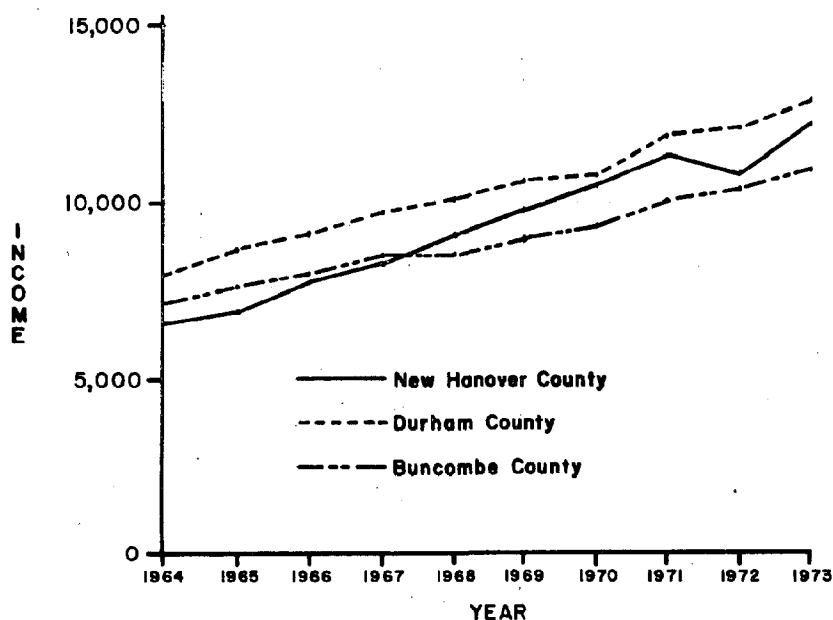
EFFECTIVE BUYING INCOME PER HOUSEHOLD
NEW HANOVER, DURHAM, AND BUNCOMBE COUNTIES: 1967, 1970, AND 1973
(Current Dollars)

County	EBI Per Household			Percent Change		
	1967	1970	1973	1967-1970	1970-1973	1967-1973
New Hanover	8,064	10,253	11,949	27.1	16.5	48.2
Durham	9,466	10,562	12,720	11.6	20.4	34.4
Buncombe	8,315	9,134	10,791	9.8	18.1	29.8

Source: Sales Management Survey of Buying Power.

FIGURE 8

EFFECTIVE BUYING INCOME
PER HOUSEHOLD
NEW HANOVER, DURHAM, AND BUNCOMBE COUNTIES: 1964-1973
(CURRENT DOLLARS)



SOURCE: Sales management survey of buying power,
(further reproduction is forbidden.)

5) FACTORS RELATED TO INCREASING INCOMES

Changes in manufacturing employment have had a major impact on New Hanover County incomes. Reference to Figures 14, 15, and 16 in the Industrial Profile section reveals significant changes in manufacturing employment characteristics in New Hanover County during the 1962 to 1972 period in which the county experienced rapid income growth. The county's employment trends over the last decade show a steady significant increase in new-type and durable manufacturing sectors which are characterized by higher technical skill requirements and higher wages and salaries. This trend stimulates the up-grading of skills by local citizens and the migration of more semi-skilled, skilled, and professional employees to the county.

Diversification and the resulting improvement in the county's industrial mix has closely paralleled rising incomes. The growing durable industries, in addition to providing increased incomes, are importing money to the local economy by exporting goods to markets outside the county.

The nature of unemployment trends in New Hanover County is closely related to the increasingly diversified industrial mix. Tables 3 and 4 in the Labor Force Characteristics section of this report illustrate the favorable employment trends in the Wilmington SMSA compared with the state and other SMSA's within the state. For the period 1970 through 1973 the county's unemployment rate averaged 0.9 percentage points below the state. Although New Hanover County has suffered from the recent national economic recession, the Wilmington SMSA had the second lowest unemployment rate of the seven North Carolina SMSA's and was 2.3 percentage points below the state as a whole in January, 1975. This relatively low rate for the area is a reflection of local industrial diversification, thus eliminating the reliance on one or two types of manufacturing employment and lowering the local economy's susceptibility to fluctuations in the national economy.

SUMMARY

The preceeding analysis of Planning Area incomes indicate:

1. The Planning Area income is increasing at a rapid rate even when compared with other urban counties in the state.
2. This increase is attributable in large part to parallel changes in the type of manufacturing employment and accompanying industry mix which, in turn, is affecting greater immigration of professional, skilled, and semi-skilled workers.
3. This growing population and accompanying increasing incomes is stimulating a rapidly growing trade sector which is serving both the local population and an expanding trade area outside the county.

II. INDUSTRIAL PROFILE

This section provides the second element of the profile of New Hanover County's economy by tracing the growth and development of the county's industrial sectors over a period of years. Major emphasis has been given to identifying significant changes in the industrial composition in recent years; the factors causing these changes; and the effects of these changes on employment, income and other important aspects of New Hanover County's economy. In developing this descriptive profile of the county's industry, no attempt has been made to determine the interrelationships between industries and their markets. This aspect of the local economy is described in a separate technical document which uses the "Input-Output" technique to analyze New Hanover County's economy.^a

A. AGRICULTURE

Agriculture has played an important part in New Hanover County's development. The part-time farmer is still relatively common in outlying parts of the county, particularly in the Castle Hayne area. However, the role of the agricultural sector of the area's economy as measured in dollar volume is minor and appears to be diminishing further.

The major dollar volume crops in the county are flowers, nursery crops, soybeans, and tobacco. Horticulture accounted for approximately 45 percent of the county's total farming revenues in 1971.

The increasing urbanization of New Hanover County, coupled with industrial growth, taxes, changing agricultural practices, and low crop prices have all led to the decline of agriculture as a major economic activity. Another factor leading to the demise of the local small farm is the opportunity to realize a profit through the sale of land to developers.

While there are well over an estimated one hundred allotment farms in the county according to the local Agricultural Stabilization and Conservation office, the local Agricultural Extension Service estimates there to be no more than ten persons in the county who make their entire living by farming. The Agricultural Stabilization and Conservation office concurs with this estimate. There are no indicators showing a trend reversal as to the future of agriculture in the county; however, national factors such as scarce energy and the close proximity of New Hanover County to lucrative eastern markets may produce an up-swing in the agricultural sector.

B. MANUFACTURING

1) Historical Perspective

New Hanover County's manufacturing was long based on the forest and

^aWilmington-New Hanover Planning Department, "An Input-Output Analysis of the Wilmington SMSA Economy."

farm products of its hinterland -- naval stores, lumber, cotton -- which received minimum processing before being exported for secondary processing outside the area. Fertilizer materials were imported into the Wilmington area and processed for use in the rural hinterland. During the two world wars, shipbuilding boomed but subsided when combat ceased. After World War II, manufacturing expanded in textiles, apparel, food, and steam boiler products but accounted for only a small portion of the economic base.

As shown in Table 12, only twelve new firms began production in New Hanover County over the thirteen year period from 1954 through 1967. However, these firms initiated a significant change in the structure of the local manufacturing industry. In 1963, the value added by manufacturing (value of finished products minus cost of production) began to rise after remaining relatively unchanged during the previous ten years. In 1965 employment in industries producing durable goods began to increase rapidly as new plants opened and established plants expanded their production. Over the next seven years, employment in durable goods grew at a much faster rate than employment in the non-durable manufacturers (see Figure 10). Within the durable category, fabricated metals grew the fastest and by 1972 was the dominant industry, employing nearly 2,900 workers.

Among the larger manufacturing firms in New Hanover County are Babcock and Wilcox Company, Corning Glass Works, General Electric Company, Hercules Incorporated, The Singer Company and Timme Corporation.

The importance of manufacturing employment can be clarified by grouping industries into generalized classifications that point out developing trends and the impact of the trends on the local economy. Manufacturing in New Hanover County and the southeast in general can be grouped into three classifications -- traditional, new-type, and locally-oriented industries. Traditional industries (textiles, apparel, and lumber) historically have been the dominant type of manufacturing in the southeast. The new-type industries (chemicals, fabricated metals, and machinery) are activities which until recently accounted for only a small fraction of the total manufacturing employment. Locally oriented industries (food, printing, stone, clay, glass and miscellaneous) are manufacturers producing goods which have predominantly local markets. The distribution and change in manufacturing employment by industry type is shown in Table 13. Employment trends for these three generalized classifications are shown in Figure 11.

2) Traditional Industries

For several decades, manufacturing employment in New Hanover County was concentrated in the traditional industry category, mainly in textiles and apparel. From 1940 through the mid-1960's these industries employed over 50 percent of the production workers. After peaking in 1966, employment in this category leveled off, then began to decline. This resulted not from production cutbacks but from increased mechanization and improved technology. Through modernization, output per worker has increased to a point where it is now possible for the textile and apparel industries to increase production while cutting back their labor force.

TABLE 12

NUMBER OF MANUFACTURING ESTABLISHMENTS AND VALUE ADDED
WILMINGTON, NEW HANOVER COUNTY, THE WILMINGTON SMSA, AND NORTH CAROLINA - 1954-1972

	1954	1958	1963	1967	1972
<u>North Carolina</u>					
Establishments Value Added by Manufacturing Capital Expenditures	6,645 2,210,463 129,622	7,289 3,095,677 168,612	7,784 4,566,547 314,428	8,266 6,606,500 664,600	8,578 11,023,100 989,400
<u>SMSA</u>					
Establishments Value Added by Manufacturing Capital Expenditures	131 28,367 1,594	141 29,970 1,356	133 43,263 16,710	156 85,700 50,800	150 481,200 120,700
<u>New Hanover County</u>					
Establishments Value Added by Manufacturing Capital Expenditures	101 25,820 1,405	106 24,724 1,013	106 36,896 16,084	113 80,300 50,500	122 473,700 120,300
<u>Wilmington</u>					
Establishments Value Added by Manufacturing Capital Expenditures	74 20,912 1,184	71 13,988 810	70 26,016 1,184	76 52,900 (D)	Data Not Available

Note: Value added by manufacturing and capital expenditures are in thousands of dollars.
(D) Withheld to avoid disclosure.

Source: Census of Manufacturers, U.S. Bureau of the Census.

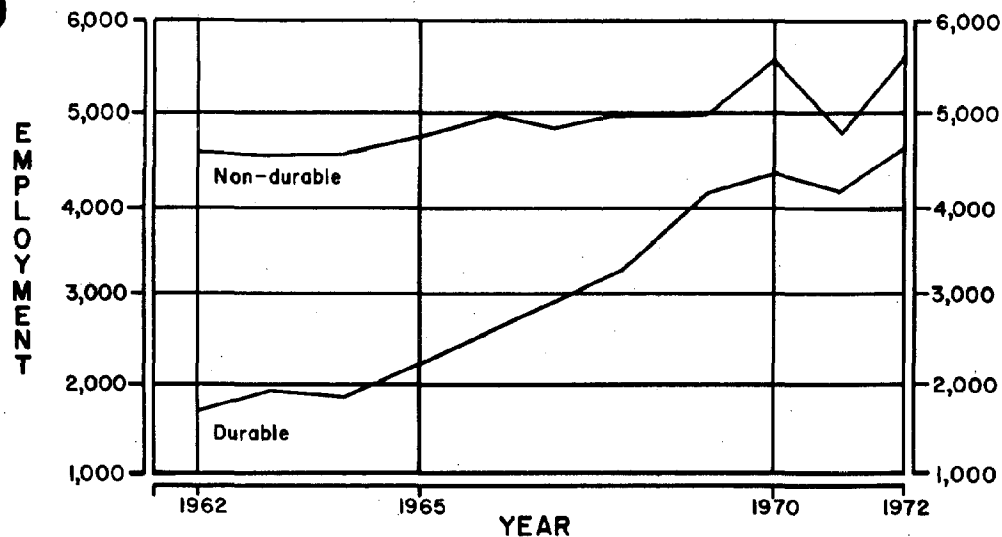
TABLE 13

NEW HANOVER COUNTY MANUFACTURING EMPLOYMENT: 1962 and 1972

	Number		Change 1962-1972	
	1962	1972	Number	Percent
<u>Traditional</u>				
Textiles	1,630	1,360	(- 270)	(- 16.6)
Apparel	1,530	1,590	60	3.9
Lumber and Wood	840	800	(- 40)	(- 4.8)
Sub Total	4,000	3,750	250	(- 6.3)
<u>New Type</u>				
Fabricated Metals	690	2,890	2,200	318.8
Machinery	50	500	450	900.0
Chemicals	510	1,110	600	117.6
Sub Total	1,250	4,500	3,250	260.0
<u>Locally-Oriented</u>				
Food	710	970	260	36.6
Printing	230	310	80	34.8
Stone, Clay, Glass	110	280	170	154.5
Miscellaneous	100	350	250	250.0
Sub Total	1,150	1,910	760	66.1
Total All Industries	6,400	10,160	3,760	58.8

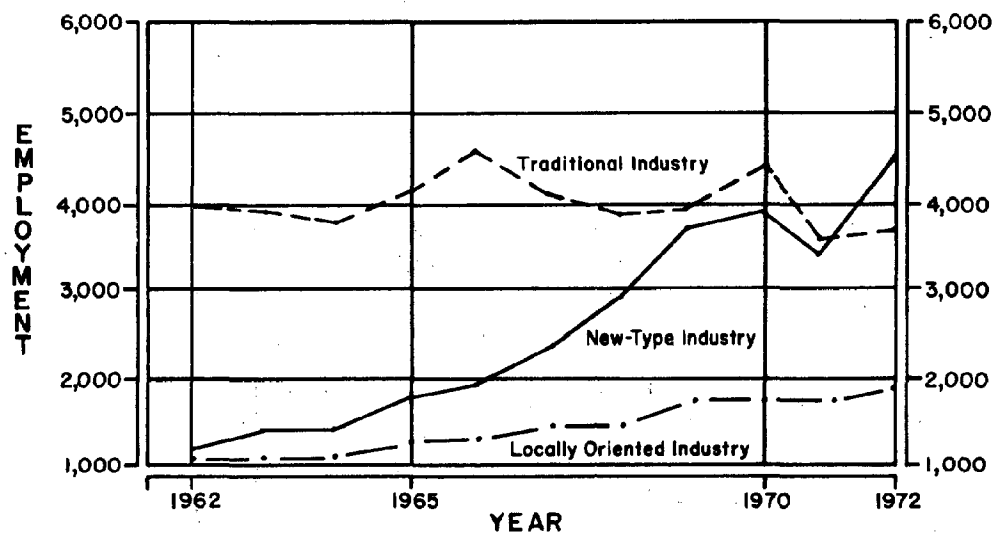
Source: Annual Average Work Force Estimates 1962-1972, Employment Security Commission of North Carolina.

FIGURE 10
MANUFACTURING EMPLOYMENT
New Hanover County--1962-1972



SOURCE: Annual average work force estimates 1962-1972.
 Employment Security Commission of North Carolina.

FIGURE 11
MANUFACTURING EMPLOYMENT
New Hanover County--1962-1972



SOURCE: Annual average work force estimates 1962-1972
 Employment Security Commission of North Carolina.

The traditional industries have historically employed semi-skilled and unskilled workers and hence have been the low income producers. Although modernization has added higher paying skilled jobs, this industry category is still characterized by unskilled jobs and low wages. In 1972 the traditional industries employed nearly 37 percent of the manufacturing workers in New Hanover County, but produced less than 26 percent of the total manufacturing payroll. As shown in Table 14, the average weekly wages for workers in textile and apparel plants were \$118 and \$84, respectively, as compared to an average of \$127 for all manufacturing workers. However, wages paid by these industries in New Hanover County were roughly the same as the state average.

3) New-Type Industries

During the 1960's the structure of manufacturing in New Hanover County changed significantly and in doing so made a significant impact on the total economy. In the mid-1960's new-type industry began to expand. New plants were constructed and established firms began expanding their production. Over the seven year period from 1966 to 1972 employment in the new-type industries increased from 1,860 to 4,500, a gain of 142 percent. During this period the fabricated metal industry nearly tripled its employment while the chemical industry increased by more than 54 percent. Employment in the machinery industry grew fourfold; however, it still accounted for only 10 percent of the total labor force working in the new industry category.

Among the larger manufacturing firms included in the new-type industries are Babcock and Wilcox, Corning Glass Works, General Electric and The Singer Company.

The rapid growth in the new-type industries is significant not only in the number of new jobs created, but more importantly in the amount of money injected into the local economy as a result of higher wages. These industries are highly productive firms employing professional, skilled and semi-skilled workers. In 1972 the weekly wage for workers in the new-type industries averaged \$181, as compared to \$100 and \$133 for the traditional and locally-oriented categories. The fabricated metal industries, in addition to being the largest employer, also paid the highest average wage -- \$195 per week. As indicated in Table 16, this pay rate was substantially higher than the average for any industrial group in the state.

The new-type industries, with more mechanized production, have also had a profound effect on the productivity of the factory worker. Productivity per worker (value added in manufacturing less pay per employee) is a good measure of the quality of an area's manufacturing. During the decade preceeding development of the new-type industries, productivity per worker in New Hanover County remained virtually unchanged while the state average increased by more than 100 percent. With the addition of the new industries, productivity per employer improved substantially to surpass the state average in 1967. In four years, productivity in the county industries increased by over 109 percent to \$9,081 per production worker. Continued development of the new-type industries with their high-valued products resulted in a considerable increase in productivity between

TABLE 14

AVERAGE WEEKLY WAGES IN MANUFACTURING
NEW HANOVER COUNTY AND NORTH CAROLINA: 1972

	New Hanover County	North Carolina
<u>Traditional</u>		
Textiles	\$118.83	\$118.38
Apparel	84.08	83.87
Lumber and Wood	99.84	120.18
Traditional Average	100.05	112.91
<u>New-Type</u>		
Fabricated Metals	194.51	155.47
Machinery	144.84	165.20
Chemicals	164.82	174.47
New-Type Average	181.16	166.24
<u>Locally - Oriented</u>		
Food	120.60	124.14
Printing	132.25	143.06
Stone, Clay, Glass	136.01	137.41
Miscellaneous	157.10	143.12
Locally-Oriented Average	132.70	134.26
Average All Industries	\$142.23	\$127.44

1967 and 1972. According to the 1972 Census of Manufacturers, productivity in New Hanover County had increased to \$47,600 per production worker -- nearly four times the state average. This high value is due to the concentration of specialized manufacturers in New Hanover County which produce high-valued products. Table 15 contrasts the productivity of manufacturing workers for Wilmington areas and the state.

TABLE 15

Productivity of Manufacturing Workers: 1963, 1967, and 1972

Area	Dollar Output Per Production Worker			Percent Change	
	1963	1967	1972	1963-1967	1967-1972
North Carolina	6339	8174	12,553	28.9	53.6
Wilmington SMSA ¹	4854	9138	46,678	88.3	411.0
New Hanover County	4349	9081	47,609	109.0	424.0
Wilmington	3968	9487	25,550	139.0	169.3

1. Wilmington Standard Metropolitan Statistical Area (SMSA) includes Brunswick and New Hanover County.

Source: Census of Manufacturers, U.S. Bureau of the Census

In addition to the new industries which have located in New Hanover County, a number of new-type industries have also located in Brunswick County. Recently constructed chemical and fabricated metal plants are major employers of manufacturing workers in Brunswick County. These industries are important to the economy of New Hanover County because a significant portion of the workers attracted into the area by these industries established their residences in New Hanover County; consequently, a sizeable portion of the payrolls of these companies is interjected into the economy of New Hanover County.

4) Locally Oriented Manufacturing

Historically, New Hanover County has had a number of industrial firms which manufactures products primarily for the local market. These locally oriented manufacturers include food processing; printing and publishing; stone, clay and glass industries; and a variety of unclassified industries.

The perishable nature of most food products limits the time, and hence, distance between production and consumption. Consequently, most food processors operate within the local market. However, there are a few food processing firms that market products outside the local economy. Bakery, beverage, and dairy products are the major food items produced for local consumption.

Due to the weight and bulkiness of their products, most stone, clay and glass industries are locally oriented. The transportation cost incurred in handling their products limits exporting them for any great distance. One exception to this is cement manufacturing which does export large quantities of its product. The major locally oriented producers included in this class are concrete, sand and gravel firms, all of which exist as support elements for the construction industry.

The printing and publishing sector includes commercial printing and newspaper publishing. Commercial printing firms take a semi-finished product produced by other local industries (business, government agencies, and manufacturers) and produce a finished item for use by these industries. Thus commercial printing is a service oriented manufacturer and is linked directly to other segments of the local economy. Newspapers to a large extent are also service oriented in that they function as an information media for the county and surrounding area. However, from an economic point of view newspapers function as an advertising media which is dependent on other local businesses. Newspapers are considered as manufacturing industries since they produce an item for sale. In general, production in the locally oriented manufacturing category is linked closely with production in other economic activities. Similarly, employment in this type manufacturing is a function of employment in other sectors of the local economy. Over the ten year period from 1962 to 1972, employment in local manufacturing grew in direct proportion to the total county employment and maintained a constant share (four percent) of the total. Employment in food processing maintained a relatively stable growth rate in response to increased demands by the population. Employment in printing and the stone, clay and glass industries fluctuated with employment changes in the industries to which they are linked.

Although locally oriented manufacturers employ relatively few workers in comparison to other manufacturers, they are important as an income producer. In 1972, wages in this category averaged significantly higher than in the traditional category but were well below the average for new-type industries (Refer to Table 14). Food processing paid the lowest average wage while the miscellaneous industries is due to high paying jobs in a number of small but highly skilled industries. In 1972, locally oriented manufacturing generated approximately \$13.2 million in income for workers in New Hanover County.

C. CONSTRUCTION

During the past decade, the construction industry has been a major element of the local economy. An accelerated rate of construction has injected money into several associated industries including finance, real estate, building material dealers and a variety of retail businesses which market hardware and household products. The manpower requirements have provided employment for a significant portion of the local labor force, both skilled and unskilled -- nearly 6 percent in 1972.

A review of the construction industry indicates not only its economic importance but also reveals the changing social and economic characteristics of the residents. The recent boom in construction is mainly a direct result of the changing social and economic desires of the civilian household. The major factors impacting construction trends during the past decade include:

1. A growing population resulting from natural increase and immigration.
2. An abnormally high rate of family formation.
3. Expanding employment opportunities with higher wages.
4. The price of housing relative to the purchaser's ability to pay.
5. The desire of inter-city dwellers to move to the suburbs.
6. The availability of developable land and public utilities.

According to records of the city and county Building Inspectors^a, nearly 11,300 dwelling units were constructed in New Hanover County during the period from 1966 through 1973 with 54 percent being built in the city. (See Table 16).

The unit mix for the two reporting areas is substantially different. For the eight year period residential construction in Wilmington totaled 6,097 units of which 73 percent were multifamily units. Within the unincorporated county area only eight percent of the total units were in multifamily structures. The concentration of multifamily units inside the city is due primarily to the lack of adequate water and sewer utilities to handle demands of high density developments in the unincorporated areas. The rapid increase in apartment construction reflects efforts to meet the demand for housing by young married couples, persons whose income will not support purchasing a home, the growing number of one person households, and college students.

^aThe County Building Inspector reports permits for the county area excluding the areas of the City of Wilmington and Wrightsville, Carolina and Kure Beaches.

TABLE 16

RESIDENTIAL CONSTRUCTION: 1966-1973

Jurisdiction	Number of Units							Total 1966-1973
	1966	1967	1968	1969	1970	1971	1972	1973
<u>Wilmington</u>								
Single Family	135	189	190	129	437	369	192	35
Multi-Family	78	433	302	515	411	314	1,171	1,197
Total	213	622	492	644	848	683	1,363	1,132
<u>Unincorporated New Hanover County</u>								
Single Family	230	365	567	477	701	752	866	830
Multi-Family	2	--	2	10	20	66	32	269
Total	232	365	569	487	721	818	898	1,099
<u>Total Planning Area</u>								
Single Family	365	554	757	606	1,138	1,121	1,058	865
Multi-Family	80	433	304	525	431	380	1,203	1,466
Total	445	987	1,061	1,131	1,569	1,501	2,261	2,331
								6,464
								4,822
								11,286

Source: Building Inspection Departments, Wilmington and New Hanover County.

The predominance of single family construction in the unincorporated area is primarily a result of the desire to move to the suburbs and the availability of developable land outside the city. Avoidance of city taxation is another factor influencing home ownership outside the Wilmington city limits.^a

Table 17 illustrates trends in the value of new construction in the two reporting areas. These statistics are estimated cost of materials and labor reported on the building permits. These data have been adjusted by the "Engineering News-Record" construction cost index to permit a valid comparison of values over the eight year period. The cost of land is not included in these values; hence, they do not reflect selling prices.

^aProperty in the unincorporated area of the county is only taxed at county rates, while property in the city is taxed by both the city and the county.

TABLE 17

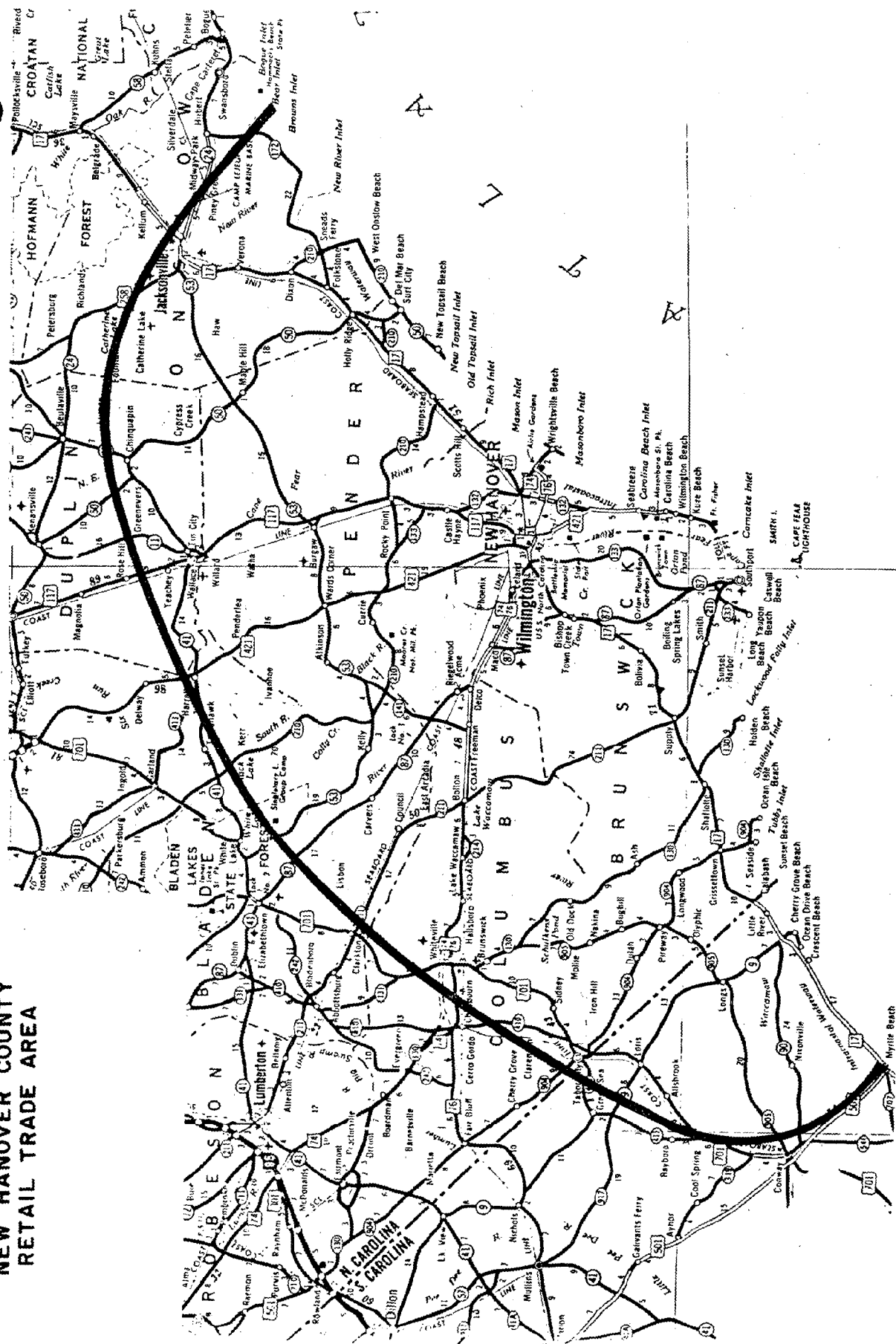
VALUE OF NEW CONSTRUCTION

AUTHORIZED BY BUILDING PERMITS: 1966-1973
(In 1967 Dollars)

	1966	1967	1968	1969	1970	1971	1972	1973
<u>City of Wilmington</u>								
Residential	\$ 3,870,837	\$ 6,852,873	\$ 5,765,429	\$ 5,963,630	\$ 8,703,230	\$ 8,386,158	\$ 4,580,035	\$ 8,054,396
Commercial	2,809,980	6,032,693	4,431,551	6,127,296	2,213,340	2,812,709	4,759,716	3,375,044
Industrial	2,029,809	402,008	1,261,726	1,618,697	283,822	609,865	1,057,346	157,410
Institutional	1,537,258	25,500	477,765	530,519	2,455,471	654,850	192,806	659,392
Total	\$10,247,884	\$13,313,074	\$11,936,471	\$14,240,142	\$13,655,863	\$12,463,582	\$10,589,903	\$12,246,242
<u>Unincorporated New Hanover County</u>								
Residential	\$ 4,078,650	\$ 6,267,571	\$ 8,670,375	\$ 6,884,171	\$ 9,908,244	\$10,271,410	\$12,049,406	\$10,899,459
Commercial	184,647	216,754	211,054	772,093	225,906	530,122	428,590	368,305
Industrial	38,065	5,407,774	153,660	53,687	1,180,262	505,766	1,836,618	1,245,134
Institutional	362,393	714,984	639,422	693,724	186,750	210,563	283,645	1,773,429
Total	\$ 4,663,755	\$12,607,083	\$ 9,674,511	\$ 8,403,675	\$11,501,162	\$11,517,870	\$14,598,259	\$14,286,327

Source: Building Inspection Departments, Wilmington and New Hanover County.

FIGURE 12
NEW HANOVER COUNTY
RETAIL TRADE AREA



D. RETAIL AND WHOLESALE TRADE

Wilmington has long functioned as the commercial center of southeastern North Carolina. Expansion of manufacturing employment, population growth, and increased wages have had a significant impact on the growth of local trade industries -- both retail and wholesale trade. Increased employment and rising incomes of the trade area (see Figure 12) population have similarly added demands for new and different goods and services.

The county's trade sector is second only to manufacturing in terms of the number of jobs provided for local residents. In 1972, approximately 20 percent of the total county work force was employed in the trade sector (Refer to Table 9, Work Force Characteristics).

1) Retail Trade

The retail trade sector of an area's economy is a good indicator of overall area economic growth. Tables 18 and 19 show total sales for Wilmington and New Hanover County by major business groups, adjusted with the Cost of Living Index to 1967 constant dollars for comparative purposes. Total adjusted New Hanover County dollar volume sales in the 1967-72 interval increased by 51 percent, while adjusted city total retail sales increased by 30 percent. Leaders in retail business sales volume were food stores, automotive dealers and general merchandise. These three groups accounted for over 57 percent of total county sales in 1972 (see Figure 13).

Wilmington's economic stagnation from 1954 to 1963 may be attributed to a variety of factors including production cutbacks following the Korean War, the recession of the late 1950's, and the closing of the Atlantic Coast Line Railroad regional office in Wilmington.

The nationwide trend toward suburban shopping centers is also evident in New Hanover County. Downtown Wilmington retail merchants hope to minimize the effects of outlying centers with the revitalization of a segment of Front Street in a semi-mall motif. Another significant factor affecting commercial sales is that within both the city and county, merchandising efforts are frequently hampered by excessive strip commercialization.^a This practice places unnecessary demands for services on municipalities and dilutes the merchandising potential offered through clustering of sales outlets.

^aStrip commercial activity exists when properties adjacent to a length or strip of roadway are developed commercially with little or no regard to adjacent commercial activities, and each business functions in disassociation with others along the roadway.

TABLE 18

TOTAL RETAIL SALES BY MAJOR BUSINESS GROUPS, WILMINGTON: 1963, 1967 and 1972

In 1967 Dollars (000)

Type of Retail Business	1963	1967	1972	Percent Change	
				1963-67 ^a	1967-72
All Retail Businesses	83,822	116,900	152,683	39.5	30.6
Building Materials	1,868	(D)	4,324	NA	NA
General Merchandise	10,320	18,162	28,608	76.0	57.5
Food Stores	20,097	27,911	35,440	39.8	27.0
Automotive Dealers	19,182	22,077	28,950	15.1	31.1
Gasoline Stations	4,055	7,048	8,736	73.8	24.3
Apparel, Accessory	6,233	6,744	9,588	8.2	42.2
Furniture	3,796	(D)	8,852	NA	NA
Eating, Drinking Places	3,650	5,567	7,845	52.5	40.9
Drug Stores	3,246	4,659	(D)	43.5	NA
Other Retailers	11,375	13,520	(D)	18.9	NA

(D) Withheld to avoid disclosure.

Source: Census of Retail Sales, 1963, 1967, and 1972.

TABLE 19

TOTAL RETAIL SALES BY MAJOR BUSINESS GROUPS, NEW HANOVER COUNTY: 1963, 1967 and 1972

In 1967 Dollars (000)

Type of Retail Business	1963	1967	1972	Percent Change	
				1963-67	1967-72
All Retail Businesses	109,695	131,523	199,106	19.9	51.4
Building Materials	4,614	(D)	15,480	NA	NA
General Merchandise	14,413	22,106	33,291	53.4	50.6
Food Stores	27,839	30,768	43,093	10.5	40.1
Automotive Dealers	20,069	22,514	38,274	12.2	70.0
Gasoline Stations	7,177	9,242	12,377	28.8	33.9
Apparel, Accessory	7,031	6,902	9,997	-1.8	44.8
Furniture	4,500	5,506	9,757	22.4	77.2
Eating, Drinking Places	6,299	7,874	12,488	25.0	58.6
Drug Stores	4,289	5,023	6,451	17.1	28.4
Other Retailers	13,464	(D)	17,898	NA	NA

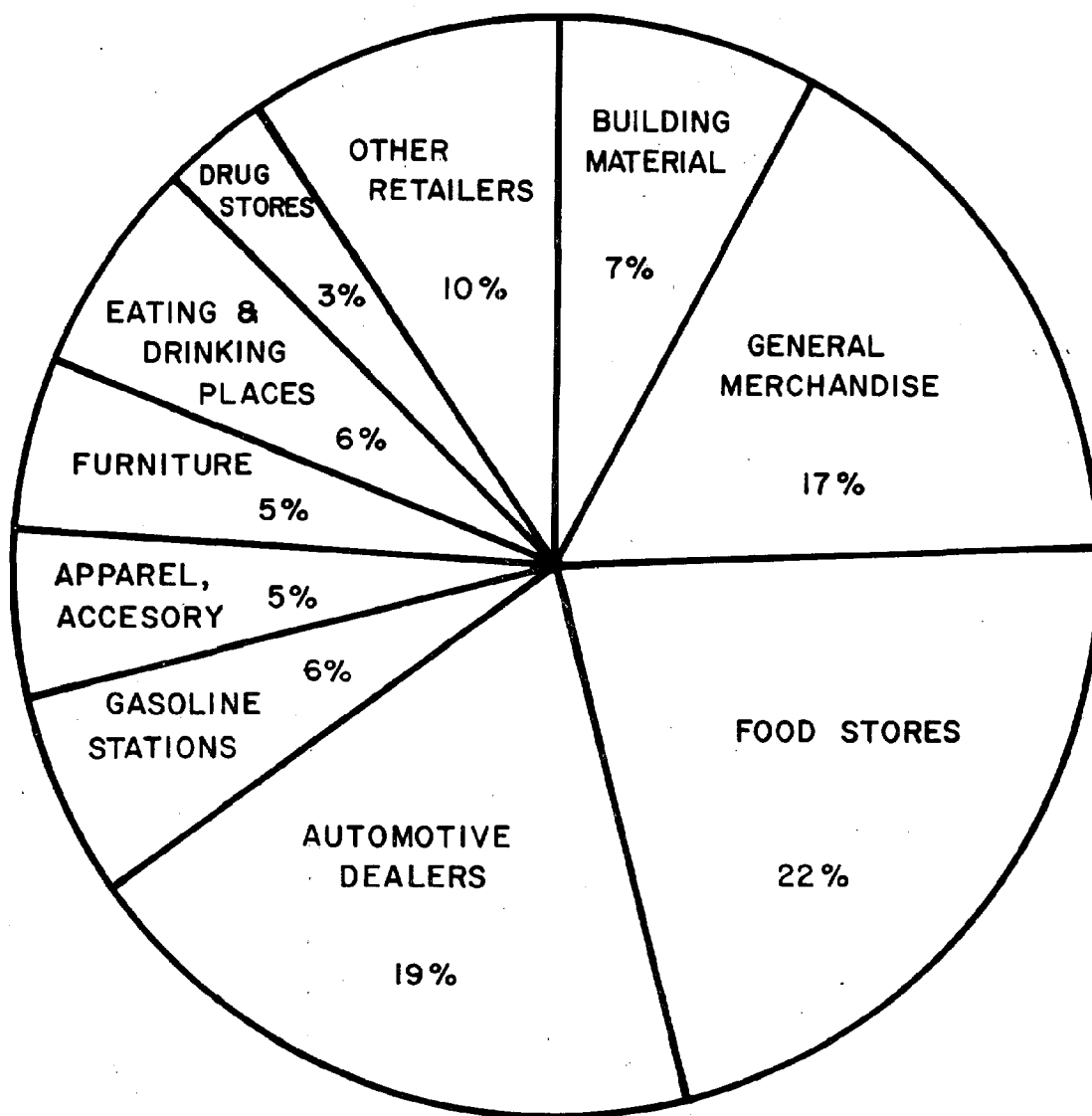
(D) Withheld to avoid disclosure.

Source: Census of Retail Sales, 1963, 1967 and 1972.

^aThe growth rate for 1963-1967 is inflated by the inclusion of establishments in the 1967 census which were annexed to the city after the 1963 census.

FIGURE 13

**RETAIL SALES BY MAJOR BUSINESS GROUPS
NEW HANOVER COUNTY, 1972**



2) New Hanover's Retail Trade Potential

A buying power index^a, which is indicative of an area's retail trade potential, is shown in Table 20. The buying power index includes the three major determinants of market potential -- population, effective buying income, and retail sales. The index represents a modification of the buying power index published by Sales Management Magazine's "Survey of Buying Power" in that Sales Management's index is based on national percentages, whereas the index figures here represent the counties' percent of total state buying power from 1964 through 1973. Of the five counties shown, New Hanover County is second only to Wake County in buying power growth with a rate 13.2% between 1964 through 1973.

The county's rising incomes, growing population, and increasing retail sales are acting in concert to create new retail markets and thereby to generate expansion of existing establishments and encourage new establishments.

3) Wholesale Trade

Wholesaling encompasses the activities of merchant wholesalers, manufacturer's sales branches, merchandise brokers and agents, petroleum bulk plants and terminals, and marketers of farm products. Wholesaling is an important facet of the county's economy. According to the latest available county data (1972) the dollar volume of county wholesale trade exceeded the retail trade volume by more than 15 percent. Petroleum and petroleum products comprise a major part of the area's wholesaling activity at over 38 percent of total dollar volume for the Wilmington SMSA in 1972. Table 21 shows wholesale trade sales volume for the city and county adjusted to 1967 constant dollars.

E. SERVICE ACTIVITIES

Service industries consist of personal services (laundries, beauty and barber shops, photographic studios, etc.); miscellaneous business services (credit bureaus, advertising agencies, business consulting, etc); hotels, motels, tourist courts and trailer parks; auto repair and services, miscellaneous repair services (golf and country clubs, theatrical presentation, etc.). Employment in this sector accounts for approximately one tenth of the total work force participation, dropping slightly between 1962 and 1972, from 10.3 percent to 9.17 percent.

The county has experienced considerable growth in service industry sales activity in recent years (see Tables 22 and 23). In the five years between 1967 and 1972 total adjusted county sales increased by 45 percent, with the auto repair, miscellaneous business services, and hotels and motels groups all increasing at relative rates greater than 80 percent. County recreation sales rose almost 70 percent. Personal services lead in total 1972 dollar volume sales, followed by hotels and motels, and miscellaneous business services.

^aThe buying power index is calculated by a weighted average giving a weight of 5 to percent of state effective buying income, a weight of 3 to percent of state retail sales, and a weight of 2 to percent of state population. The formula is: $BPI = \frac{5(\% EBI) + 3(\% Retail Sales) + 2(\% Population)}{10}$

TABLE 20
BUYING POWER INDEX
SELECTED NORTH CAROLINA COUNTIES
1964 THROUGH 1973

Year	New Hanover County	Pitt County	Durham County	Wake County	Buncombe County
1964	1.74	1.40	2.70	4.66	3.46
1965	1.72	1.39	3.02	4.78	2.99
1966	1.79	1.37	2.94	4.98	3.53
1967	1.86	1.38	2.91	4.89	3.52
1968	1.90	1.40	2.86	4.96	3.39
1969	1.85	1.38	2.90	5.22	3.21
1970	1.91	1.41	2.94	5.46	3.07
1971	1.97	1.46	3.00	5.48	3.03
1972	1.92	1.44	2.98	5.46	3.04
1973	1.97	1.39	2.95	5.52	3.01
% Change 1964-1973	13.2%	-0.7%	9.3%	18.5%	-13.0%

Source: Sales Management Survey of Buying Power, Wilmington-New Hanover Planning Department.

TABLE 21
WHOLESALE TRADE
Sales in 1967 Dollars (000)

	1963	1967	1972	Percent Change	
				1963-67	1967-72
New Hanover County	\$153,310	\$170,747	\$234,825	11.4	37.5
Wilmington	\$115,654	\$115,192	\$157,817	(-0.4)	37.0
Remainder of County	\$ 37,656	\$ 55,555	\$ 77,008	47.5	38.6

Source: 1967 Census of Business: Wholesale Trade

TABLE 22

SELECTIVE SERVICES - WILMINGTON

TOTAL SALES BY MAJOR BUSINESS GROUPS: 1963, 1967 and 1972

In 1967 Dollars (000)

Type of Business	1963	1967	1972	Percent Change	
				1963-67	1967-72
All Services	10,767	15,288	20,494	42.0	34.1
Personal Services	4,841	6,744	6,597	39.3	-2.2
Misc. Business Services	1,669	2,507	4,355	33.4	73.7
Hotels, Motels, Tourist Courts	799	1,680	2,593	110.3	54.3
Auto Repair and Services	(D)	1,759	3,209	---	82.4
Miscellaneous Repair	1,158	1,317	1,500	13.7	13.9
Amusement, Recreation	(D)	1,281	2,240	---	74.9

(D) Withheld to avoid disclosure.

Source: Census of Selected Services, 1963, 1967, 1972, and Wilmington-New Hanover Planning Department.

TABLE 23

SELECTIVE SERVICES - NEW HANOVER COUNTY

TOTAL SALES BY MAJOR BUSINESS GROUPS: 1963, 1967 and 1972

In 1967 Dollars (000)

Type of Business	1963	1967	1972	Percent Change	
				1963-67	1967-72
All Services	14,150	19,335	28,094	36.6	45.3
Personal Services	5,423	7,025	7,119	29.5	1.3
Misc. Business Services	1,907	3,098	5,576	62.5	83.0
Hotels, Motels, Tourist Courts	1,879	3,553	6,425	89.1	80.8
Auto Repair and Services	1,742	2,008	3,818	15.3	90.1
Miscellaneous Repair	1,591	1,802	2,026	13.3	12.4
Amusement, Recreation	1,608	1,849	3,130	15.0	69.3

Source: Census of Selected Services, 1963, 1967, 1972, and Wilmington-New Hanover Planning Department.

In part the growth of service activity is attributable to higher incomes enjoyed by county residents and the concomitant demand for more and better services. Population growth, the influence of in-migrants, and the growth of the recreation industry is reflected here, too. Additionally, there is an additive effect in which support of an activity such as theatrical presentations encourages other entrepreneurs to initiate similar ventures.

A large part of the tourism dollar goes into service activities (see Figure 14). While tourism plays an increasingly significant role in the economy of the area, it is difficult to actually quantify its economic impact, and while data sources vary widely on estimates of county tourism revenues, clearly tourism is one of the most significant elements in the service sector.

Wilmington is located along the eastern seaboard corridor, and in addition to attracting tourists to the area, it is a stopover point for travelers from other areas who are journeying along the eastern coast. It is estimated that one out of every six tourists in the U.S. journeys along the Atlantic Coast between Florida and Maryland.^a Recognizing the enormous potential of the county's recreation industry, New Hanover County's economic development program should concentrate on the full development of this significant county economic resource.

F. TRANSPORTATION

Transportation, communication, and utilities employment accounted for almost eight percent of the county's 1972 work force, increasing slightly in relative percentage over the previous decade. Because of the significance of the port as an economic determinant, it is discussed in the following section of this report.

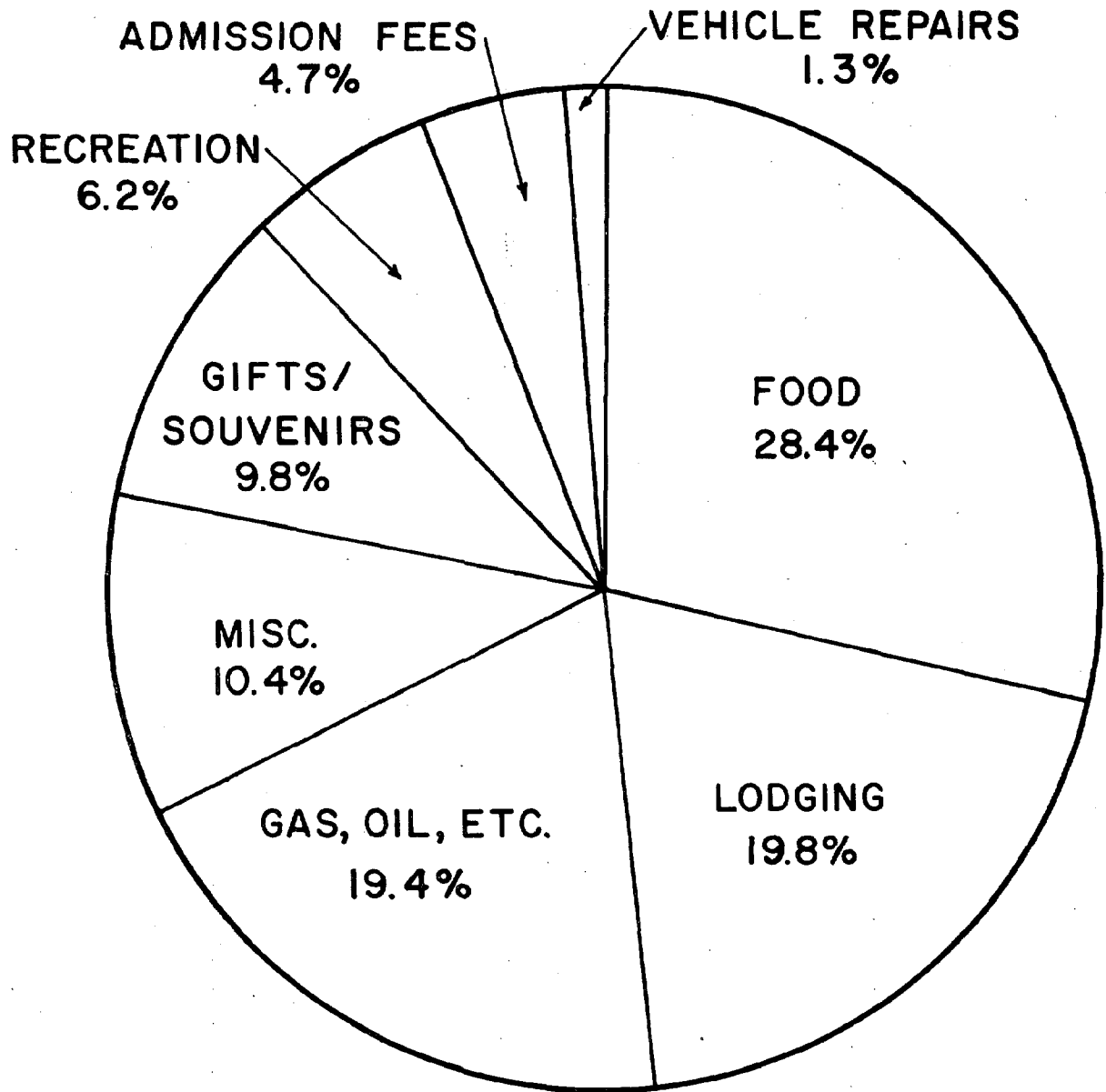
The configuration and growth of an area is frequently related to the physical features with which the area is endowed. Development of the Wilmington areas has been greatly influenced and shaped by its relationship to water.

Historically, Wilmington functioned as a regional port from its beginning settlement in the 1700's through the nineteenth century. The port served as North Carolina's main point of entry for products required by the state's industries. In 1840 the Wilmington and Weldon Railroad was constructed, linking the port with North Carolina's agricultural hinterland and increasing access to export markets. Strengthening of the Piedmont rail network, however, coupled with Piedmont industrial growth and the decline of cotton production and forest products as major area exports eventually led to a decline causing Wilmington to become a regional center of trade and service.

^aNorth Carolina Travel Survey, Dr. Lewis Copeland, Department of Statistics, University of Tennessee.

FIGURE 14

**DISTRIBUTION OF TRAVEL EXPENDITURES
IN NORTH CAROLINA, 1973**



**SOURCE: 1973 North Carolina Travel Survey, prepared by
Research Triangle Institute of the Research
Triangle Park, North Carolina.**

The rail deemphasis of Wilmington and later development of a north-south highway system through the Piedmont combined to further diminish the importance and increase the isolation of Wilmington. The position of the area as a regional trade and service center has lessened, but the influence of water transport as well as other transportation modes is still strong.

1) Port of Wilmington

Wilmington Harbor is one of two deep water harbors in the state. Principal among local facilities is the North Carolina State Ports Authority (SPA) facilities. The SPA terminal has the capacity to handle containerized cargo, and has open and dry storage warehouses. Adjacent to the State Port are numerous private port facilities, the majority of which are involved with petroleum or chemicals transport. Residual fuel oil and gasoline were the Port of Wilmington's leading tonnage commodities in 1973, altogether constituting 44 percent of total port freight traffic.^a

2) Import-Export Mix

As shown in Table 25 the port's import-export tonnage mix has shifted from a position of export dominance in 1954 (6:1) to one of import dominance in 1973 (3.8:1). This change is important to the local economy, because simplifying greatly, exports represent goods which bring dollars into the community while imports represent goods for which dollars are paid and leave the area. Leaders in foreign import tonnage in 1973 were residual fuel oil, which comprises half the total foreign import tonnage volume, and crude petroleum. Leaf tobacco shipments lead foreign exports at 29 percent of total foreign export tonnage.

The absence of port linkages with other modes of transportation currently prevents the Port of Wilmington from reaching its full potential. Due to inadequate road linkages with other centers of commerce, particularly the North Carolina Piedmont, the State Port's potential for receiving and distributing goods is limited.

3) Vehicle Registration

Vehicle ownership is one indicator of economic well-being. As incomes rise there is a propensity for families to acquire additional autos, or for a business to purchase another truck. Truck and auto ownership for the county is indicated in Table 26. County automobile registration for the period between 1960 and 1970 shows a per capita registration increase from 0.33 to 0.48, or a growth of from one car for every three persons to a car for every two people. Total registration of cars and trucks during the same period rose from 0.38 per capita to 0.56.

^a"Waterborne Commerce of the United States", Department of the Army, Corps of Engineers, 1973.

TABLE 24

WILMINGTON HARBOR FREIGHT TONNAGE, SELECTED YEARS, 1960-1973

	1960	1965	1970	1972	1973
Total Cargo Shipped	5,168,062	4,742,108	6,308,517	8,519,041	9,995,987
Total Foreign	753,999	949,269	2,132,215	3,716,613	4,299,093
Foreign Imports	472,019	754,758	1,914,751	3,540,883	4,083,311
Foreign Exports	281,980	194,511	217,464	175,730	215,782
Total Domestic	4,414,063	3,792,839	4,176,302	4,802,428	5,696,894
Coastwise receipts	2,998,187	2,190,036	2,319,703	2,439,914	2,941,789
Coastwise shipments	31,685	157,846	205,302	108,469	86,489
Internal Inbound	61,630	323,738	242,784	148,536	133,168
Internal Outbound	334,250	364,830	619,610	1,170,250	1,776,800
Through	988,311	756,389	788,903	935,259	758,648

Source: Waterborne Commerce of The United States, U.S. Army Corps of Engineers.

TABLE 25

WILMINGTON STATE PORT TERMINAL FREIGHT TONNAGE AND MODE OF TRANSPORTATION, SELECTED YEARS, 1955-1973

	1955	1960	1965	1970	1973
CARGO					
Total (in tons)	250,794	352,271	479,244	1,127,948	1,740,345
Foreign Imports	35,545	118,510	226,453	532,503	641,519
Foreign Exports	215,249	226,995	163,039	159,766	167,769
Coastwise Inbound	-0-	2,566	58,770	259,107	595,917
Coastwise Outbound	-0-	4,200	30,982	176,562	335,138
MODE OF TRANSPORTATION					
(number of vehicles)					
Ships	115	311	417	464	503
Barges	NA	NA	NA	234	592
Rail Cars	2,888	5,505	5,194	4,916	6,721
Trucks	1,924	6,441	13,912	28,565	42,187

Source: North Carolina State Ports Authority

Note: Strikes occurred as listed; 1962---65 days, 1965---20 days, 1969---55 days
1971---56 days, 1973---17 days, 1974---9 days.

Comparison of vehicle registration since the 1960's has several implications:

1. A sense of economic well-being prevailed in the decade.
2. Truck useage is frequently associated with increased industrialization. Hence, the increase signifies the apparent rise of new industry and/or growth of established firms, and an optimism about the future.
3. Demands for effective roadways to accomodate increased vehicle flow.
4. Need for measures to prevent excessive vehicular noise and activity in residential areas.

TABLE 26

ESTIMATED VEHICLE REGISTRATION
NEW HANOVER COUNTY

Year	Automobiles	Trucks	Total
1960	23,635	3,935	27,570
1961	23,234	4,099	27,333
1962	23,695	4,077	27,772
1963	25,188	4,178	29,366
1964	26,583	4,500	31,083
1965	28,054	4,834	32,888
1966	30,155	5,049	35,204
1967	32,530	5,434	37,964
1968	34,999	6,000	40,999
1969	37,905	5,822	43,727
1970	40,131	6,629	46,760
1971	43,214	7,296	50,510
1972	46,907	8,097	55,004
1973	50,542	9,192	59,734

Source: North Carolina Department of Motor Vehicles.

TABLE 27

COMMERCIAL AND PRIVATE FLIGHT ACTIVITY
NEW HANOVER COUNTY AIRPORT: 1966-1973

	1966	1967	1968	1969	1970	1971	1972	1973
<u>Flights</u> ^a	98,784	108,167	113,864	111,542	110,618	100,334	110,814	115,630
<u>Passengers</u> ^b								
Enplane	30,982	37,330	44,520	49,090	61,847	63,114	68,041	76,045
Deplane	33,586	39,690	45,798	49,460	60,121	60,168	68,828	76,649
Total	64,568	77,020	90,318	98,550	121,968	123,282	136,869	152,694
<u>Average Daily Activity</u>								
Flights	271	296	312	306	303	275	304	317
Passengers	177	211	247	270	334	338	375	418

Source: Manager, New Hanover County Airport.

TABLE 28

CARGO TRANSPORTED
NEW HANOVER COUNTY AIRPORT, SELECTED YEARS 1965-1973
(In tons)

	1965	1970	1973	PERCENTAGE CHANGE	
				1965-1970	1970-1973
<u>Enplaned</u>					
Air Freight	171.7	892.2	520.8	419.6	-41.6
Air Express	47.5	149.8	120.2	215.4	-19.8
Air Mail	55.5	132.7	87.6	139.1	-34.0
Total	274.7	1,174.7	728.6	327.6	-38.0
<u>Deplaned</u>					
Air Freight	134.7	454.7	771.8	237.6	69.7
Air Express	45.5	72.6	62.6	59.6	-13.8
Air Mail	45.4	77.4	55.3	70.5	-28.6
Total	225.6	604.7	889.7	168.0	47.1
Total Cargo	500.3	1,779.4	1,618.3	255.7	- 9.1

Source: Airport Manager, New Hanover County Airport.

^aPrivate and commercial flights - in and out.

^bCommercial passengers enplaning and deplaning only.

III. POPULATION AND EMPLOYMENT FORECASTS

Most planning decisions are either directly or indirectly based upon population and employment projections and resulting forecasts. Estimates of the size of the Planning Area's future population provide a basis for determining future demands for housing, transportation services, various types of land development, and public services and facilities. In addition, the age characteristics of the future population are important factors in determining the need for specialized public facilities and services, such as schools, hospitals and parks.

It is important to note that, although the terms "projection" and "forecast" are often used interchangeably, the terms actually represent different concepts. A projection generally represents a population size implied by extending past and current growth trends into the future. If the area's future growth mirrors its past, projections are very accurate. Forecasts, on the other hand, are future estimates which are tempered by the planner's assumptions about the future. They go beyond the projections to the extent that factors which cannot be readily quantified are considered, and in most cases they represent more realistic estimates of future population than do projections.

The purpose of this part of the report is to develop population and employment forecasts for the 1975-2000 period. The basic methodology consists of comparing and synthesizing the population projections found in Part I and the employment projections found in this part of the report. The rationale for this approach to preparing forecasts is based on two major considerations:

1. The direct relationship between employment growth and population growth. The major factor in the decision to migrate is the presence of job opportunities. Therefore, if the number of employment opportunities is not expanding, an area will not normally experience population growth.
2. The quality of the data. In developing the employment and population projections for New Hanover County, the quality of the trend data on population was felt to be superior to that on employment. Therefore, the employment and population projections have been reconciled in the forecasts, but much greater weight has been given to the reliability of the population projections.

A. PROJECTIONS

1) Population

A range of three population projections based on the "cohort-survival" technique have been included in Part I of this report (page 40). Each of these projections includes different assumptions concerning the three population growth variable -- births, deaths, and migration. They were prepared,

however, without any explicit consideration of the economic growth trends in the Planning Area.^a

The population projections for New Hanover County are summarized in Table 29.

TABLE 29

SUMMARY OF POPULATION PROJECTIONS -- 1980-2000

Year	Population Projections		
	Low	Moderate	High
1980	94,038	97,546	101,317
1990	107,613	116,740	124,608
2000	122,829	140,283	151,468

2) Employment

Projections of both total county resident population and employment are shown in Table 30. These projections are based on a "least-squares" analysis of employment data from the U.S. Bureau of the Census. In essence, the "least-squares" technique is a straight-line projection of the county's past growth trends into the future. It should be noted that these projections tend to be conservative.

3) Comparison of Population and Employment Projections

In order to compare the employment and population projections, the county's projected employment has been converted to an implied population level. As discussed previously, total employment and total population are directly related, and by applying conversion factors which account for labor force participation, it is possible to approximate the total population required for a given level of employment.

As discussed in the "Labor Profile" section of this report a participation rate of 42.5 to 45.0 can be expected for New Hanover County. Therefore, participation rates of 42.5, 43.75, and 45.0 have been used to convert projected employment to population for the years 1980, 1990, and 2000.

TABLE 30

CONVERSION OF EMPLOYMENT PROJECTIONS TO POPULATION: 1980, 1990 and 2000

Year	Projected Employment	Conversion Factor	Projected Population
1980	38,750	.4250	91,176
1990	44,750	.4375	102,286
2000	48,900	.4500	108,667

Source: Wilmington-New Hanover Planning Department.

^aA detailed explanation of the assumptions used in deriving these projections is found on page 40.

To facilitate comparison, the population projections in Table 30, together with the three cohort-survival population projections have been plotted in Figure 15. This comparison reveals a wide disparity between the four sets of projections, with projection based on employment being the most conservative.

B. FORECASTS

In developing forecasts of New Hanover County's population and employment, quality of data is a major consideration. The projection, either population or employment, which utilizes data best reflecting the area's growth should be the basis for making forecasts of future population and employment. As discussed in Part I, the high "cohort-survival" population projection is highly reliable, because not only does the projection technique treat all three growth variables--births, deaths, and migration--it also utilizes up-to-date data (1974) on these variables. In contrast, the employment projections are based on a "straightline" technique using data for the 1930 to 1970 period. In comparison, the employment projections appear to be much less reliable than the "high" population projection; therefore, the "high" projection has been selected as the population forecast for New Hanover County.

Using participation rates and adjusting for commutation, the population forecast has been used to derive an employment forecast. The following assumptions are inherent in this process:

1. Survival and birth rates remain the same as the 1970-73 period.
2. Migration increases during the 1970's then declines moderately.
3. Labor force participation rates increase for nonwhite males and females of all races.
4. Unemployment will stabilize at five percent.
5. Net commuting as a percent of total workforce will increase slightly in the 1970's then decline slightly.

These forecasts are shown in Table 31.

In addition to the forecasts of total employment, it has been necessary to allocate total employment to the major industrial sectors. These allocations are very important in many planning decisions such as space allocation for industrial uses. The allocations which are found in Table 32 have been based on each industry's projected share of total employment as determined by a "least-squares" projection of total employment for each industrial sector.

Age, sex, and race breakdowns for the population forecast are found in the Appendix to Part I.

FIGURE 15
NEW HANOVER COUNTY
POPULATION PROJECTIONS

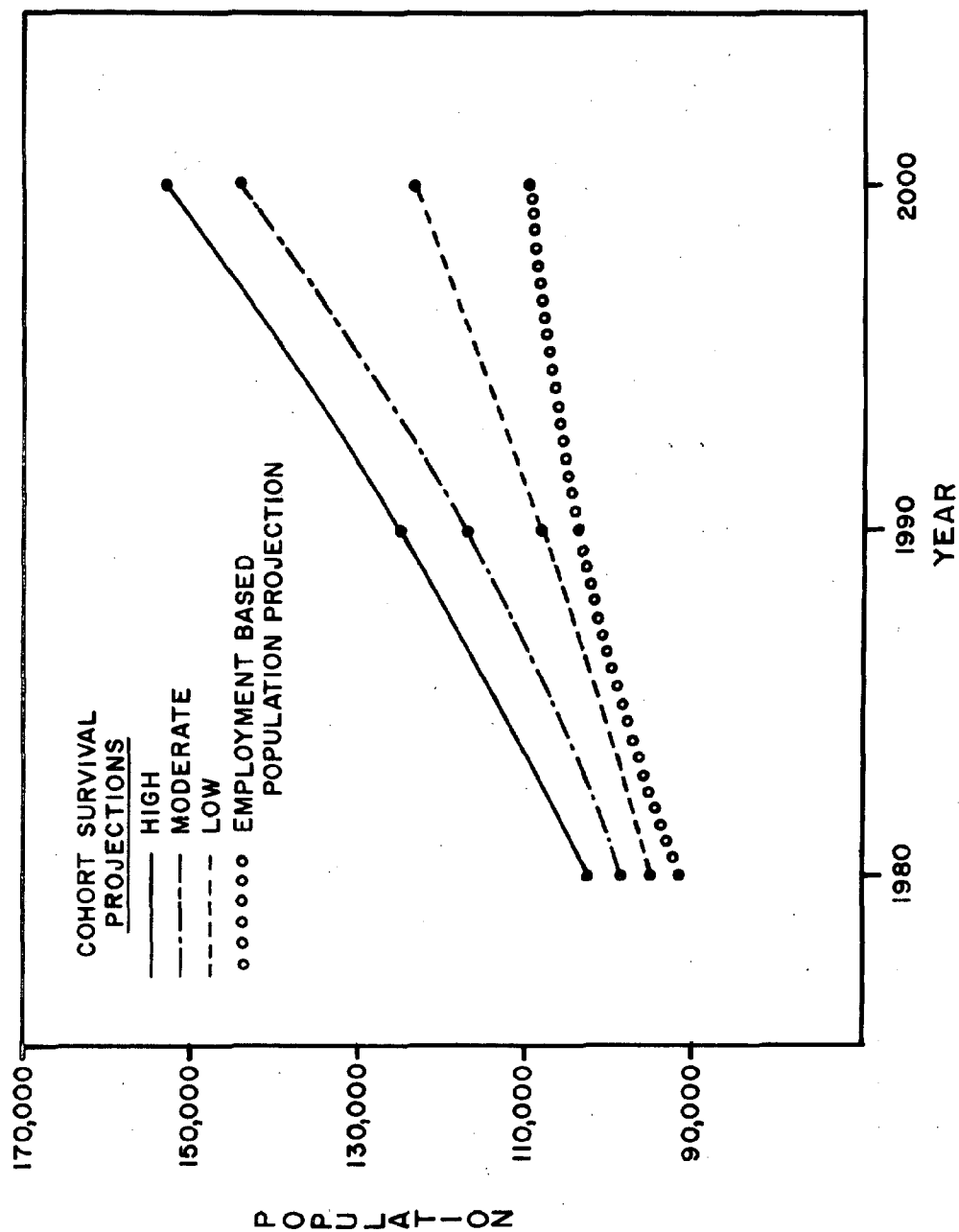


TABLE 31

POPULATION AND RESIDENT LABOR FORCE FORECAST
NEW HANOVER COUNTY: 1970-2000

	1970	1980	1990	2000
Population	82,996	101,300	124,600	151,000
Percent in Labor Force	43.4	44.5	45.9	47.4
Labor Force	36,020	45,079	57,400	71,600
Percent Unemployed	3.3	5.0	5.0	5.0
Residents Employed	34,780	42,845	54,500	68,000

TABLE 32

SECTOR WORK FORCE EMPLOYMENT FORECAST^a
NEW HANOVER COUNTY: 1970-2000

	1970	1980	1990	2000
Total	38,210	47,500	60,500	73,950
Manufacture	9,830	12,400	16,100	19,400
Non-Manufacture	22,520	29,250	37,800	47,400
Construction	2,110	2,700	3,250	3,900
Transportation, Communication, Utilities	2,890	3,750	5,000	6,350
Trade	7,360	9,900	13,450	17,350
Fire	1,220	1,700	2,090	2,600
Service	4,190	5,200	6,700	8,400
Government	4,640	5,800	7,070	8,600
Other Non-Manufacture	110	200	265	325
Other Non-Agriculture	5,390	5,500	6,300	6,800
Agriculture	470	350	300	300

^aWork force refers to the total number of workers employed in the county;
Work force includes residents employed in the county and in-commuters.

**wilmington -
new hanover
comprehensive
planning program**

TECHNICAL REPORT
2

**analysis of
existing land use**

APRIL, 1976

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I. INTRODUCTION

The characteristics and distribution of existing developed land in the Wilmington-New Hanover Planning Area demand careful attention in the land use planning process, because future development must be built on this existing base. The analysis and interpretation of existing land use provides the fundamental information which will be used to identify existing land use problems, to estimate future land needs, and to predict future development trends. In short, the characteristics of existing land uses may be considered the key shapers of public policies concerning the future use of the Planning Area's land resources.

Thus, the purpose of this report is to outline the basic information on current land utilization which is required for developing policies for future land use. It addresses both the amount of land committed to various uses and the problems resulting from the location of existing uses and the manner in which they are developed.

The analysis is based on a survey of the Planning Area's land uses conducted in the summer of 1973 and updated in the summer of 1975. As a result of this survey, the area's developed land has been placed in one of the following classifications:

1. Residential
2. Commercial
3. Industrial
4. Transportation, Communications, and Utilities
5. Office and Institutional
6. Public and Private Recreational

In addition, agriculture and commercial forestry activities, which may not be considered "developed" land uses, have been identified and analyzed.

In the analysis of land use problems, residential, commercial, and industrial uses have been treated in the greatest detail. Because they occupy the largest land area, are the most widely distributed, and have the highest potential

for conflict with other uses, these major land use categories pose the greatest problems for the Planning Area.

II. OVERVIEW OF PLANNING AREA LAND USE

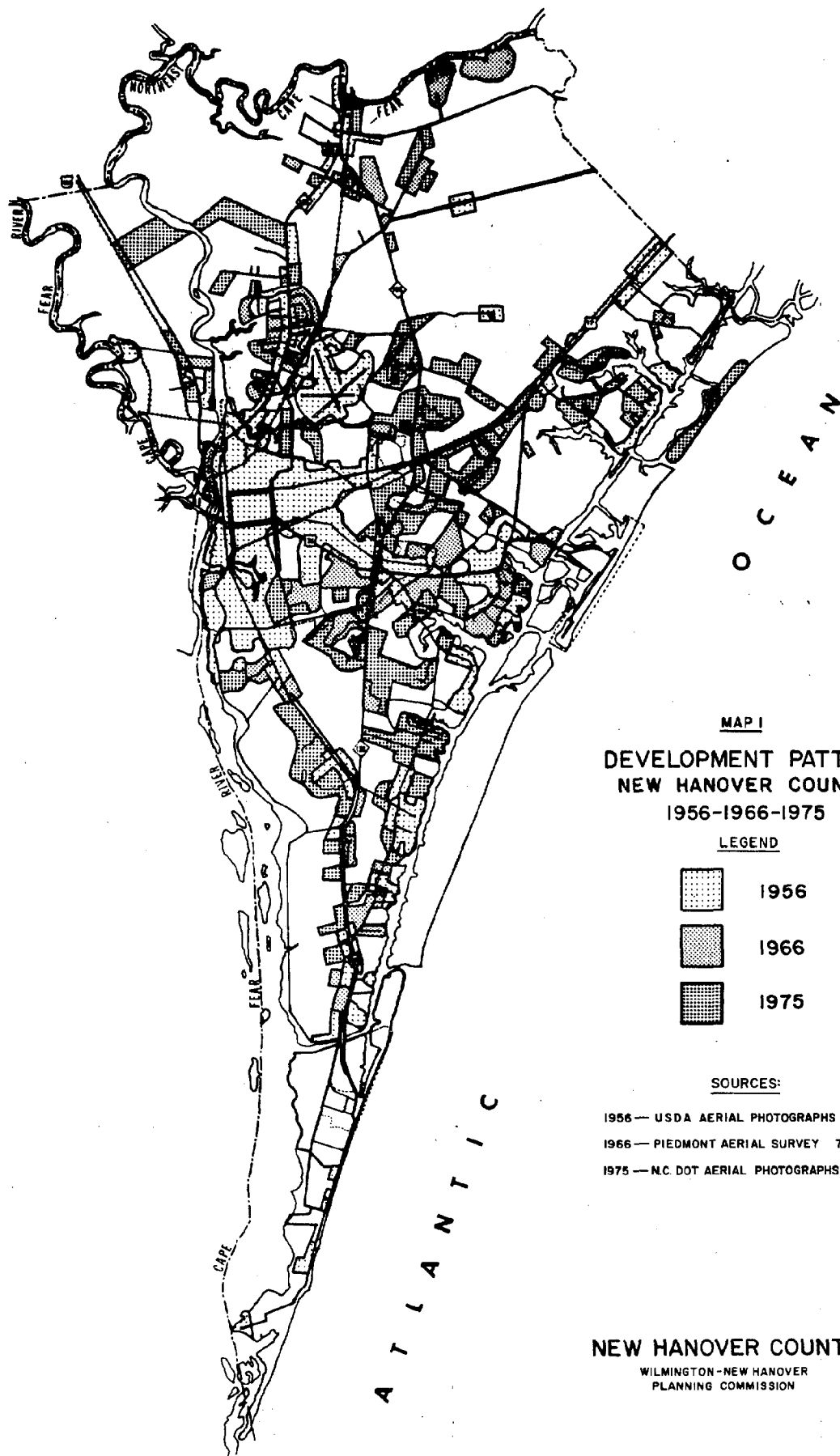
A. PLANNING AREA DEVELOPMENT TRENDS

Map 1 shows the location of developed areas in the Wilmington-New Hanover Planning Area for the years 1956, 1966, and 1975. Over time, development has occurred primarily in eastward and southward directions. This development configuration was strongly influenced by three factors: (1) the Cape Fear River which acts as a barrier to development in the west; (2) the attraction of the beaches and sounds in the east; and (3) Smith Creek which acts as a barrier to the north of the city. Relatively little development has occurred across the Cape Fear River in Brunswick County, and the area north of Smith Creek, until recently, has remained mostly agricultural.

Recent development north of Wilmington has been primarily industrial, accompanied by relatively small, compact, residential subdivisions. One reason for this trend may be that the Planning Area's significant agriculture operations are concentrated in the north and, therefore, less land has been available for development. The eastward and southward development pattern has been almost entirely residential with accompanying trade and service activities.




Transportation corridors, as in most urban areas, have exerted a strong influence on development patterns in New Hanover County. Major thoroughfare construction has given access to formerly inaccessible land, and, therefore, has promoted land subdivision and development. N.C. Highway 132 illustrates this pattern. Since the construction of this highway in the early 1960's, development has occurred in an almost continuous strip from Kings Grant Subdivision in the north to the Lansdowne Subdivision in the south.

From an overall view, development in New Hanover County exhibits some of the classic characteristics of urban sprawl conditions which may be defined as a land development pattern where scattered residential, commercial, and



MAP I
DEVELOPMENT PATTERN
NEW HANOVER COUNTY
1956-1966-1975

LEGEND

	1956
	1966
	1975

SOURCES:

1956 — USDA AERIAL PHOTOGRAPHS 6/4/56
1966 — PIEDMONT AERIAL SURVEY 7/12/66
1975 — N.C. DOT AERIAL PHOTOGRAPHS 10/18/74

NEW HANOVER COUNTY
WILMINGTON-NEW HANOVER
PLANNING COMMISSION

industrial land uses are interspersed with unused open space. Development is dispersed along major thoroughfares at relatively low densities with large amounts of vacant land in the intervening areas. This development pattern has serious consequences for both the efficient use of land resources, which are scarce in the county, and the efficient provision of public services.

B. ANNEXATION

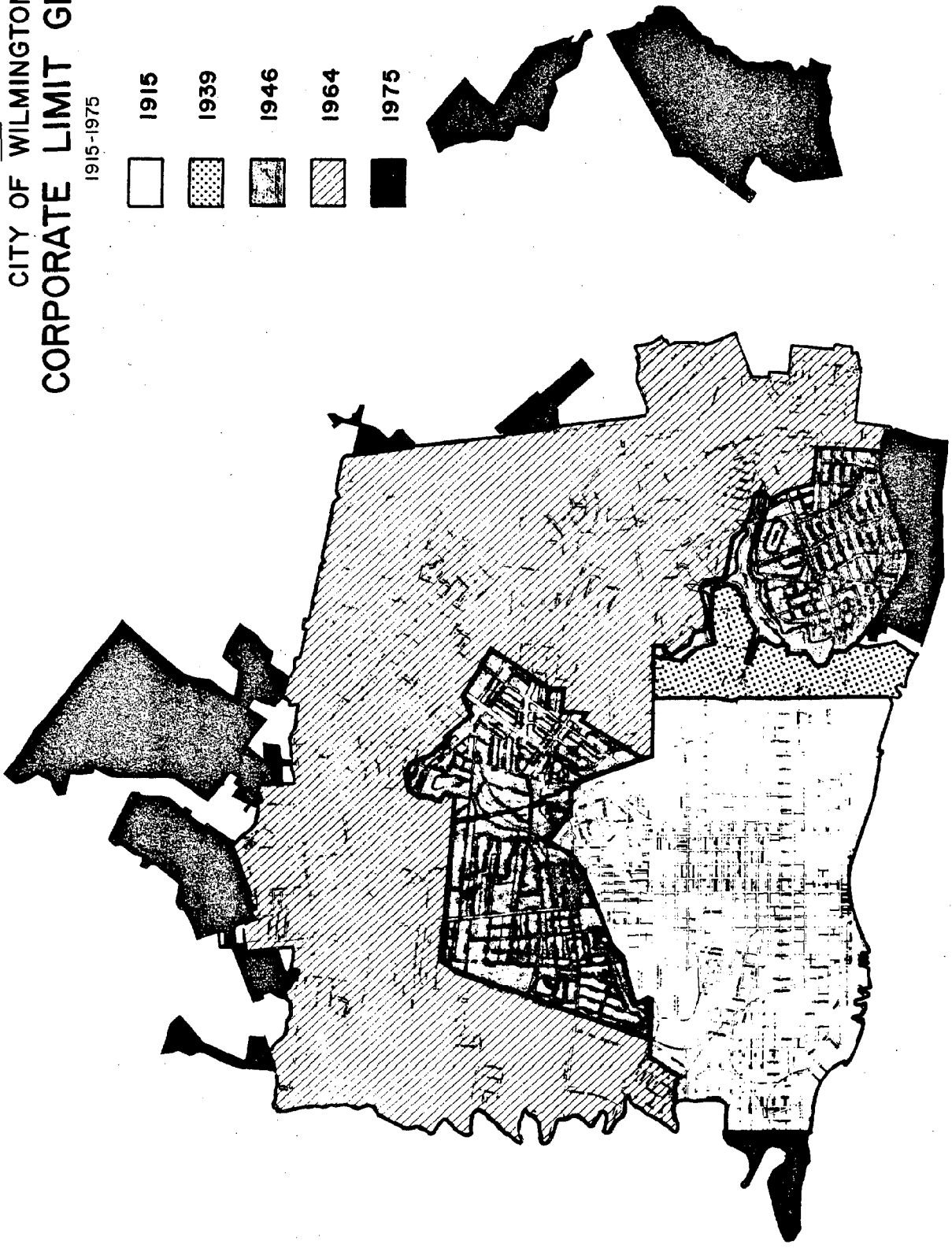
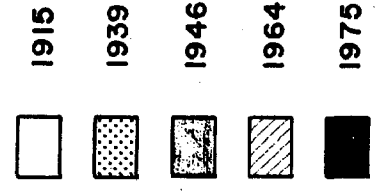
Wilmington's corporate limit expansion pattern over the last 60 years is shown on Map 2. Major annexations occurred in 1915, 1926, 1946, and 1964. Between 1964 and 1975 several minor annexations occurred and are aggregated to reveal the current municipal boundary configuration. During this period corporate growth has shown an eastward and southward movement, following the Planning Area's development trends.

MAP 2

CITY OF WILMINGTON

CORPORATE LIMIT GROWTH

1915-1975



III. ANALYSIS OF EXISTING LAND USE

Current land usage for the Wilmington-New Hanover Planning Area is illustrated by Maps 3 and 4. Map 3 is designed to show the current land use in the City of Wilmington, the surrounding urbanizing area, and the relationship between the two areas. Map 4, which is less detailed, shows the current land use in the less intensively developed areas of the county.

Table 1 summarizes the amount of land currently in use in the Planning Area. This table provides an analysis of six major land use categories as well as the amount of vacant land, agricultural land, water, and wetland found in the area. According to this analysis, 25,000 acres representing 19 percent of the total area are currently in use in the Planning Area. Approximately 9300 acres are developed in the city and 15,700 acres are developed in the balance of the Planning Area.

The major categories of land use are discussed in detail below.

A. RESIDENTIAL

1. Summary of Residential Land Use Acreage

Residences are the predominant land use in the Planning Area with approximately 11,000 acres devoted to residential uses. For the entire Planning Area, this comprises almost 44 percent of all developed land and more than 8 percent of the total land area. While 57 percent of the Planning Area's residential usage is outside the City of Wilmington's boundaries, only 40 percent of the area's population resides outside the city. This is related to the area's historical development patterns; the higher densities allowed by the public water and sewer systems available within Wilmington's boundaries; and, conversely, to the larger lots necessary outside the city for septic tanks and nitrification fields.

Maps 3 and 4

Existing Land Use -- Wilmington urbanizing area and rural areas of the Wilmington-New Hanover Planning Area -- are on display in the Wilmington-New Hanover Planning Department. These maps will be included in the final revision of the report.

TABLE 13

SUMMARY OF EXISTING LAND USE

1975

LAND USE CATEGORIES	CITY OF WILMINGTON			UNINCORPORATED NEW HANOVER COUNTY			TOTAL PLANNING AREA		
	Land Use In Acres	Percent of Total Land	Percent Developed Land	Land Use In Acres	Percent of Total Land	Percent Developed Land	Land Use In Acres	Percent of Total Land	Percent Developed Land
Residential	4,747	33.1	51.1	6,210	5.2	39.6	10,957	8.3	43.9
Trade	1,064	7.4	11.5	159	0.1	1.0	1,223	0.9	4.9
Office and Institutional	623	4.3	6.7	145	0.1	0.9	768	0.5	3.1
Industrial	153	1.1	1.6	5,470	4.6	34.9	5,623	4.2	22.5
Transportation, Communication, Utilities	2,019	14.1	21.8	2,964	2.5	18.9	4,983	3.8	20.0
Parks and Recreation	673	4.7	7.3	735	0.6	4.7	1,408	1.1	5.6
Total Developed Land	9,279	64.7	100.0	15,683	13.3	100.0	24,962	18.8	100.0
Agriculture and Forestry	--	--	--	16,100	13.6	--	16,100	12.2	--
Water and Wetland	372	2.6	--	31,268	26.5	--	31,640	23.9	--
Vacant	4,685	32.7	--	55,100	46.6	--	59,785	45.1	--
TOTAL	14,336	100.0	--	118,151	100.0	--	132,487	100.0	--

Source: Wilmington-New Hanover Planning Department

10-144

2. Residential Density Patterns

Using five density levels (high, moderate, and low density urban, suburban, and rural) the various types of residential development are illustrated in Map 5. An analysis of this map reveals three important factors:

1. Public housing comprises half of the total number of high density urban area (greater than 6 dwelling units per gross acre) within the City of Wilmington.
2. Of the 15 low density urban areas (2 to 4 dwelling units per gross acre) outside the City, only one is serviced by a central sewer system.
3. A "sprawling" development pattern has developed along major transportation corridors. Areas of suburban and urban residential densities are spotted throughout most of the Planning Area.

3. Housing Stock Composition

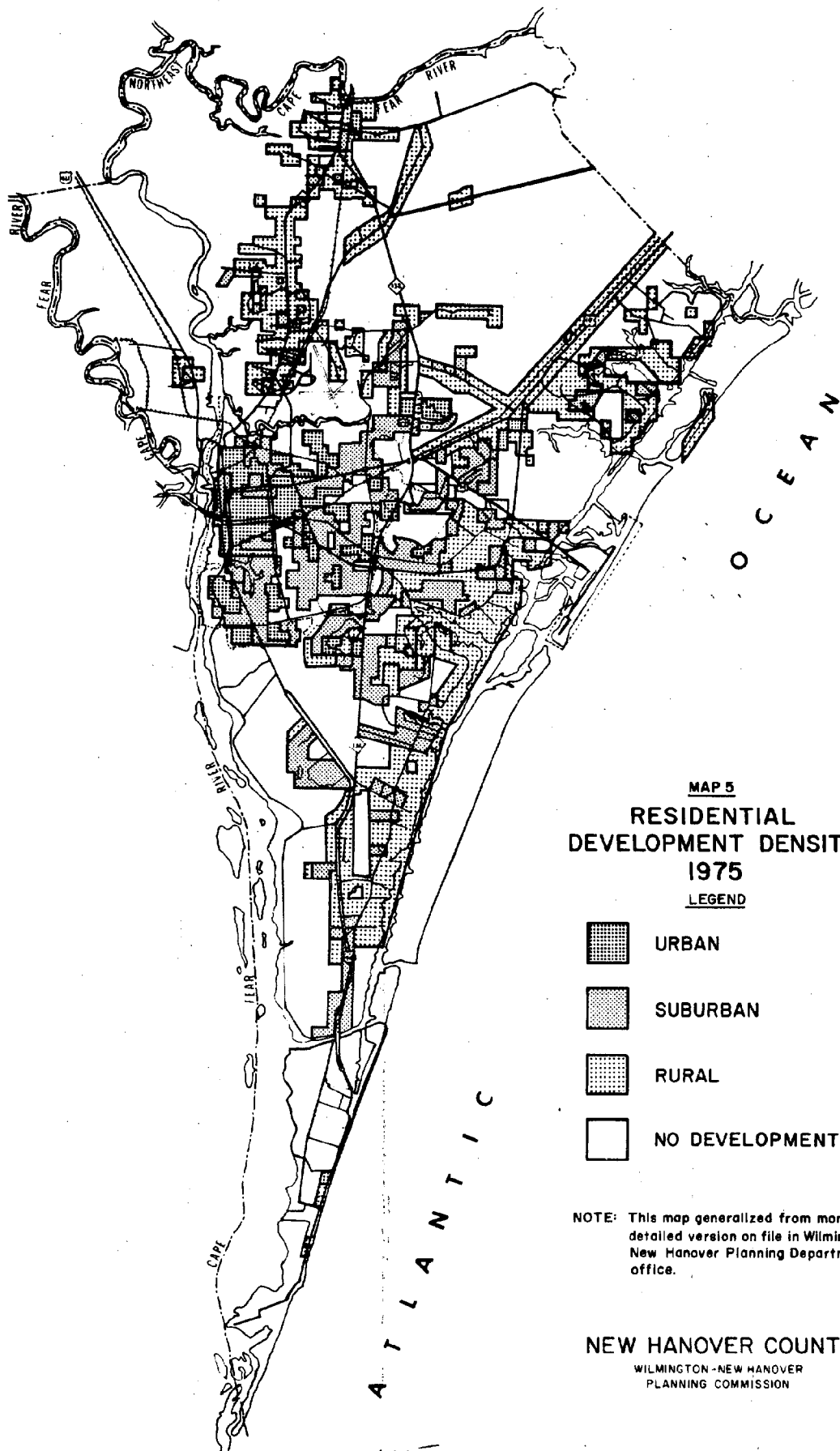
Of the 29,069 year-round housing units in New Hanover County in 1970, 69.9 percent were single family units, 10.6 percent were duplexes, 13.3 percent were apartments, and 6.3 percent were mobile homes or trailers.

Between the 1970 census and January 1, 1975, new residential building permits were issued in the Planning Area for 4,430 single family units, 2,551 multi-family units, and 2,323 mobile homes. Of this total of 9,304 authorized new units, 47.6 percent were single family units, 27.4 percent were multi-family units, and 25 percent were mobile homes. Only one apartment complex, Governours Square, was located outside the City of Wilmington. The remaining multi-family units authorized outside the City were duplexes. All new authorizations for mobile homes were outside the City during this four-year period.

4. Residential Land Use Problems

a. Neighborhood Decline

It has been observed that the establishment of incompatible land uses such as commercial activities, industries, and offices in residential areas often



triggers a definite process of neighborhood decline. This process has several distinct steps, as described below, but almost invariably its end product is a dilapidated neighborhood, a loss of essential housing, and a decline in tax revenues:

1. The establishment of incompatible uses (primarily office, commercial, and industrial uses) within a viable residential neighborhood brings with it nuisance factors such as noise, traffic congestion, visual blight, air pollution, etc. which reduce the desirability of the area for residential uses.
2. The decreased desirability of the neighborhood is followed closely by a decline in residential property values.
3. Accompanying this decline in property values is increased pessimism about the area's future particularly among its residents, the real estate industry, and investors.
4. This pessimism results in economic disinvestment by property owners in the form of reduced maintenance leading to deteriorating property conditions, tax delinquencies, a decline in the tax base, and an overall loss to the community.

The problem of incompatible uses within residential areas is most prevalent within the incorporated portion of the Planning Area. Reference to Maps 3 and 4 which illustrate existing land use, reveals that commercial, industrial, and office uses are dispersed throughout the city in such a manner as to pose a potential threat to most neighborhoods except the newer, more affluent subdivisions. This finding is reinforced by recent citizen surveys which have indicated that problems normally associated with incompatible land uses are among the priority concerns of the community.*

To illustrate the extent of this problem in the city, the following five areas have been identified as being threatened by incompatible land uses (see Map 6):

*Information obtained through New Hanover County Public Participation Program and from Community Analysis 1975: A Citizen's Guide to Wilmington Neighborhoods.

1. Spofford Mills and Pinehurst area.
2. Arcadia and Willowdale area.
3. Mercer Avenue, Rosemont, and Beaumont area.
4. Audubon area.
5. Sunset Hills.

In most cases, the existing problems of incompatible land uses are directly related to zoning practices -- the structure of the zoning ordinance and the rezoning process. The city's zoning ordinance is constructed in what is commonly referred to as a "pyramid". The ordinance restricts commercial and industrial uses in residential areas but it does not restrict residential uses in commercial or industrial districts, nor does it prevent commercial uses in industrial districts. This situation actually encourages the establishment of incompatible uses.

Rezoning is the second major factor. Numerous small tracts of land which are zoned and used for residences have been rezoned to permit more intensive non-residential uses without considering the impact on surrounding properties and the community as a whole.

The relationship between zoning practices and incompatible land uses is well illustrated by the Spofford Mills-Pinehurst and the Mercer Avenue-Rosemont-Beaumont areas. The Spofford Mills-Pinehurst area, although residential in character, is zoned for wholesale and light industrial activities (M-1). This zoning would permit any use except the most offensive manufacturing uses, in this residential neighborhood.

The Mercer Avenue-Rosemont-Beaumont area provides an example of the encroachment of incompatible uses through rezoning. Although this area was originally zoned exclusively for residential uses, recent rezonings to commercial (C-1) and wholesale and light manufacturing (M-1) districts have permitted the encroachment of incompatible uses in the area.

b. Residential Sprawl Patterns

Maps 3 and 4, which illustrate land use, and Map 5, which illustrates residential development density, clearly show a trend toward residential sprawl conditions. Following the Planning Area's major thoroughfares residential subdivisions at suburban and, in some cases, urban densities are dispersed throughout the Planning Area. Many factors which contribute to residential sprawl can be identified -- lower land costs in rural areas; the ad valorem tax system; the attraction of water-oriented recreational areas; and the placement of employment centers in outlying areas, to mention a few.

Such a development pattern has significant liabilities. In the first place, studies* have indicated that the direct public costs of scattered suburban sprawl may have been as high as \$150 per family per year in 1970; undoubtedly, they are much higher now. These costs derive from increased expenditures for public services such as police and fire protection, water and sewer, and transportation facilities resulting from inefficient land use patterns.

In addition, suburban sprawl is wasteful in its use of land. Lands which are skipped in the "leap-frogging" process of sprawl development become idle. They have no recognizable use; they are not usually farmed or used for purposeful forestry. Infilling may eventually take place; however, until that time, the land represents an economic liability.

c. Residential Septic Tanks

In the unincorporated portion of the Planning Area where central sewerage systems are not available, septic tanks are used extensively for treating domestic wastes. Unfortunately, in many areas of the county septic tanks have been developed at excessive densities or placed in unsuited soils resulting in

*Marion Clawson, Suburban Land Conversion in the United States, 1971.

a significant number of septic tank failures. A recent survey conducted by the New Hanover County Health Department* indicates that at least 19 residential subdivisions have a history of chronic septic tank problems. The location of these subdivisions is shown on Map 7.

The consequences of these septic tank failures are serious. In addition to the obvious health hazards, malfunctioning septic tank systems make a significant contribution to the pollution of surface and groundwaters, forcing the closure of shellfishing areas; and they represent an economic liability to the property owner by requiring frequent maintenance.

d. Land Drainage

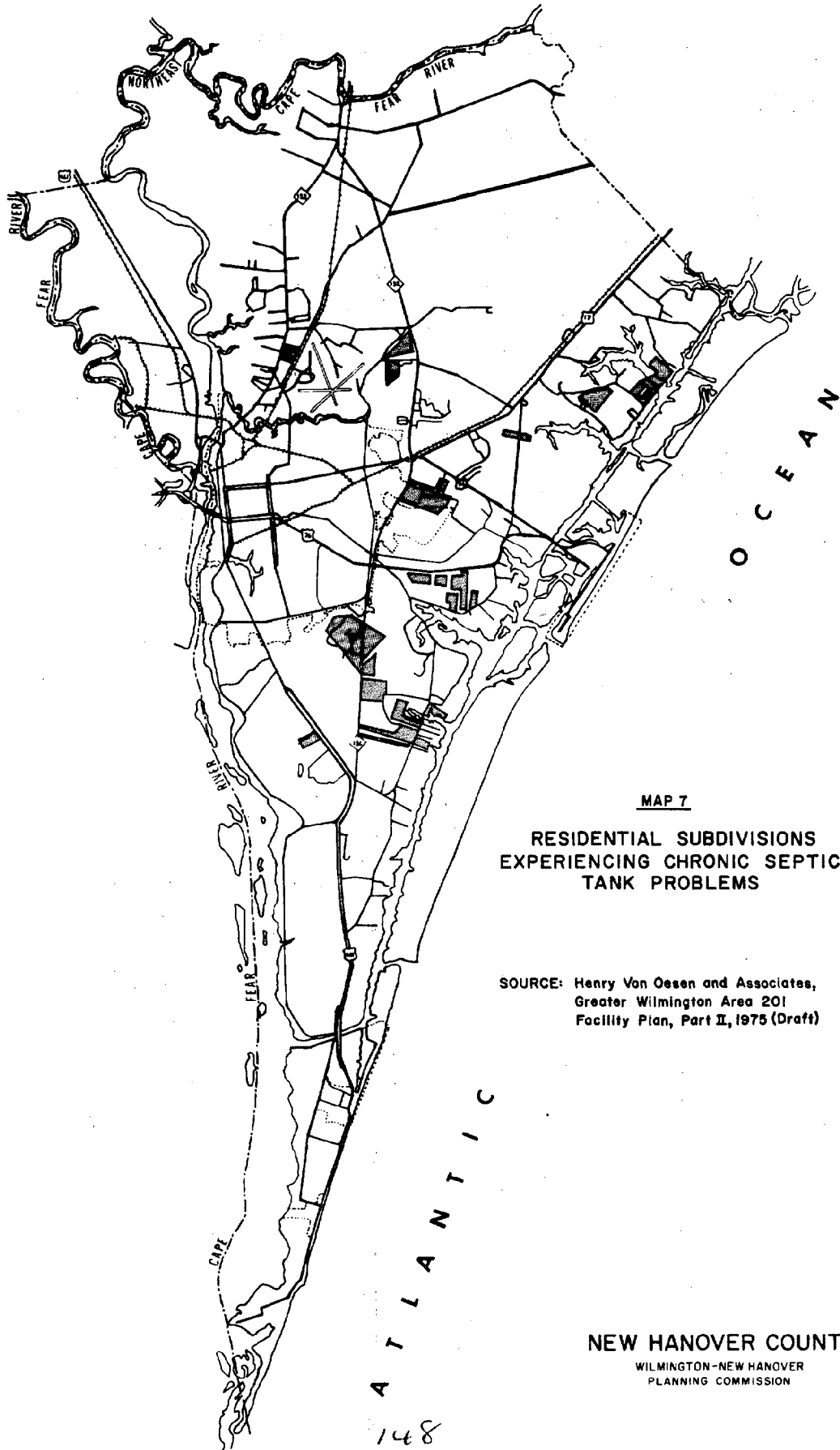
Inadequate land drainage is one of the most serious and widespread land use problems found in the Wilmington-New Hanover Planning Area. Drainage problems have been given high priority by the Planning Area's residents through the Public Participation Program. The residents' concerns for drainage have also been supported by the Planning Staff's survey of existing land use which identified numerous examples of inadequate drainage systems.

Due to an almost flat topography and the widespread occurrence of high water table conditions, extensive artificial land drainage is required in the Planning Area both to manage excess runoff generated by the development and to lower the water table sufficiently to create buildable lots and to permit the temporary use of septic tanks for sewage treatment and disposal.

The Planning Area's existing land drainage problems result primarily from three factors:

1. Inadequate initial design. In some instances the initial design of drainage systems is inadequate for managing the volume of runoff generated by the development, and may not lower the water sufficiently to prevent standing water during wet seasons and to permit proper function of septic tanks.

*Henry von Oesen and Associates, Greater Wilmington Area 201 Facility Plan, Part II, 1975 (Draft).



2. Improper construction and maintenance. This is the most serious factor. Lack of ditch stabilization, using materials such as grass or riprap, together with inadequate annual maintenance leads to siltation and an accumulation of debris which eventually cause the drainage system to fail.
3. Design of drainage systems on a parcel-by-parcel basis. Most drainage systems are designed to meet the needs of an individual subdivision with little or no attention to the overall needs of the Planning Area. The result is that the volume of water moving from one parcel to another may exceed the capacity of the downstream drainage ditch, causing serious undercutting and erosion; or that high sediment loads may be carried from one drainage system to another, resulting in excessive silting of the downstream systems.

In summary, the overall consequences of poor land drainage include standing water during wet periods, excessive erosion and sedimentation, septic tank malfunction, and increased maintenance costs to property owners.

The long-term environmental impacts of extensive artificial land drainage also present potentially serious problems for the Planning Area. The continued productivity of New Hanover County's coastal ecosystems is dependent upon maintaining the quality and natural salinity of the estuarine waters*; however, artificial drainage systems tend to significantly increase the flow of fresh water into the estuary, thereby changing the natural salinity regime. Artificial drainage also reduces the cleansing effect of vegetation on runoff and may lower the quality of the water entering the estuary. A recent study** by the U.S. Geological Survey in Northeastern North Carolina concludes that not only does artificial land drainage increase the amount of water entering the estuaries during wet periods, but also that the water removed by the drainage systems contribute significant amounts of bacteria, nutrients, pesticides, and sediment to the estuary.

*John Clark, Coastal Ecosystems: Ecological Considerations for Management of the Coastal Zone, (The Conservation Foundation: Washington, 1974), pp. 38-9.

**Ralph C. Heath, Hydrology of the Albemarle-Pamlico Region North Carolina: A Preliminary Report on the Impact of Agricultural Developments, U.S. Geological Survey Water Resources Report 9-75, May 1975. p. 75.

Clearly then, land drainage to facilitate urban development has serious environmental impacts which must be addressed by policies for future land development.

B. COMMERCIAL

1. Summary of Commercial Land Use Acreage

Eighty-seven percent, or 1,064 acres, of all commercial uses (retail and wholesale trade activity) land in the Planning Area is within the City of Wilmington. (See Maps 3 and 4.) Commercial land usage accounts for 11.5 percent of all developed land within the City, and only 1 percent of the total developed land outside the City. This distribution reflects the fact that Wilmington serves as the commercial center for a broad trading area.

Within the City of Wilmington, commercial activity is concentrated along Market Street, Third Street, Castle Street, Carolina Beach Road, and Oleander Drive. Smaller concentrations are located on South College Road, South Kerr Avenue, and Wrightsville Avenue.

Outside the City most commercial activity is located along Oleander Drive, U.S. Highway 17, and Castle Hayne Road. This commercial activity consists mainly of highway-oriented establishments (automobile sales, mobile home sales, and service stations) and dispersed neighborhood-oriented establishments (convenience food stores).

2. Commercial Land Use Problems

a. Strip Commercial Development

Within the Planning Area several traffic arteries are plagued by strip commercial development. Although there are several legitimate highway commercial activities, such as automobile sales and services and mobile home sales firms, strip commercial development occurs when a succession of unrelated and unplanned types of commercial activity develops along a segment of unlimited access traffic artery.

Strip commercial development is not only undesirable in itself but it is also detrimental to the proper development of the community. When compared with grouped or clustered commercial concentrations, the disadvantages and detrimental characteristics of strip commercial activity become apparent. The following is a list of the more obvious disadvantages of strip commercial development.

1. Strip commercial development leads to speculation and inflated land values which results in a large amount of unproductive vacant land.
2. Strip commercial development depreciates land for residential uses.
3. The additional traffic generated by strip commercial development often results in:
 - a. the necessity to make street widenings, requiring purchase of expensive commercial frontage, and the encouragement of further strip development;
 - b. vehicles turning into and out of many access points interrupt through traffic and creates serious traffic hazards.
4. Strip commercial uses are at a definite disadvantage when competing with grouped commercial concentrations which are able to attract greater number of shoppers.
5. Strip commercial development often results in uncoordinated, garish signs which lower the overall aesthetic quality of the community.

Many of the disadvantages of this type of development are apparent in the Wilmington-New Hanover Planning Area. In the City of Wilmington, it is most apparent on Market Street, Oleander Drive, and Carolina Beach Road. The early stages of strip commercial development are becoming apparent along sections of Wrightsville Avenue, making this street extremely vulnerable to the continued encroachment of commercial uses. Steps should be taken at this time to prevent further commercial rezonings in this area, and existing commercially zoned parcels which are vacant should be examined for possible rezoning to less intensive uses.

Outside the City there are two traffic arteries where the problems of strip development are apparent and two for which there is a high potential for

strip commercial problems. Strip commercial development exists along Market Street (U.S. Highway 17) from the City Limits to the community of Ogden. Although there is less commercial activity, a similar situation occurs on Castle Hayne Road from the City Limits through Wrightsboro. Due to the land use mix in this area, this traffic artery carries much industrial and residential traffic, and continued commercial expansion can only lead to further problems along this already overburdened highway.

The potential for strip commercial development exists along Oleander Drive from the vicinity of Forest Park Drive to Greenville Loop Road. At present, there are many legitimate highway commercial establishments along this segment. The encroachment of other types of commercial activities in this area raises the potential for undesirable strip development.

To a lesser extent the same problem exists on Wrightsville Avenue parallel to Oleander Drive. It has been caused by continued encroachment of various commercial and service activities from the City Limits to the general vicinity of the Cape Fear Hospital.

b. Over-Zoning

Over-zoning exists when more property is zoned for a particular use than the market demands. An analysis of the amount of land zoned for commercial uses and the amount actually used indicates that the Planning Area is significantly over-zoned.

It is estimated that in the Planning Area approximately 2,800 acres are zoned commercial. Of this amount, approximately 1,200 acres, or 43.0 percent, are currently in commercial use. According to general planning estimates of commercial needs, a 10 percent margin above existing commercially developed land should be zoned to allow for expansion. If this estimate is accurate, then approximately 1,320 acres of land should be zoned for commercial uses. Since 2,800

acres in the Planning Area are currently zoned commercial, it appears that the area is excessively over-zoned for commercial uses.

Over-zoning is most visible in the portion of the Planning Area lying outside the City Limits. In this area, 1100 acres are zoned for commercial uses while approximately 160 acres are actually in use. Using the 10 percent rule-of-thumb mentioned above, only 180 acres of commercially zoned land is needed in the unincorporated area, indicating that five times more land is zoned commercial than is needed.

In the city, approximately 1700 acres are zoned commercial and 1100 are in use. With an indicated need for 1220 acres of commercial land, this represents 39 percent more land zoned for commercial uses than needed.

Over-zoning creates several physical and economic problems. Among its main disadvantages are the following:

1. Over-zoning causes inefficient and spotty development patterns.
2. Over-zoning diminishes the potential for the most desirable sites to be utilized.
3. Unused, over-zoned land is removed from other productive uses.
4. Over-zoning eliminates the potential advantages of clustering mutually supportive uses.

C. INDUSTRIAL

1. Summary of Existing Industrial Land Use Acreage

This category includes all manufacturing establishments, warehousing, stockpiles, tank farms, and resource production and extraction.

There are approximately 5,600 acres devoted to industrial use in the Planning Area, making it the second most extensive category. Industry accounts for 22.5 percent of all the developed land in the Planning Area. There are 5,470 acres, 97 percent, located outside the City of Wilmington, while only 153 industrial acres are located in the City.

Industrial activity outside the City is found mainly along U.S. Highway 421; the area bounded by North 23rd Street, Castle Hayne Road and Smith Creek, the General Electric plant on Castle Hayne Road; the area bounded by Sunnyvale Drive, the City Limits of Wilmington, and the Cape Fear River; and, the area immediately north of Market Street and N.C. Highway 132.

In the city, industrial activity is located mainly in five areas:

1. In an arc beginning south of the Northeast Cape Fear River Bridge extending through the Brooklyn neighborhood to Love Grove;
2. Along the Cape Fear River south of the Memorial Bridge to the city limits;
3. Around the intersection of Shipyard and Burnett Boulevards;
4. Along the eastern ends of Marstellar and Kidder Streets;
5. Around the intersection of Oleander Drive, Dawson, and Wooster Streets.

2. Industrial Land Use Problems

a. Encroachment Into Residential Areas

Examination of Maps 3 and 4, which illustrate existing land use, clearly reveals a trend toward the encroachment of industrial uses into residential and commercial areas. Some of the more obvious examples are the Brooklyn-Love Grove area; the Covil Avenue area; the intersection of Oleander Drive and Wooster and Dawson Streets; and the intersection of 41st Street and Lake Street in Lincoln Forest.

The negative consequences of the encroachment of incompatible land uses into residential areas have been discussed in Section III, A,4. It may be assumed that similar problems -- reduced property values, reduced maintenance, and property decline -- would result from the encroachment of industrial uses into viable commercial districts.

b. Industrial Dispersion and Over-Zoning

While there is an observable degree of clustering of industrial uses in the City, the trend in unincorporated areas of the county appears to be toward dispersion. Most recently developed industries, such as General Electric and Hercules, are located individually on large tracts of land. Although this trend has not reached serious proportions at this time, it does present some significant problems from the standpoint of the efficient utilization of prime industrial lands, the efficient delivery of public services, protection of natural resource areas, and traffic congestion.

A more clustered or compact industrial development pattern would reduce the cost of providing basic public services, such as water, sewer and fire protection. In addition, clustered industrial districts could reduce the adverse environmental impacts of industrial development. For example, if industries were located in close proximity to one another along Rt. 421 North, they could utilize common docking facilities and thereby protect valuable wooded swamp areas adjacent to the river. It should be emphasized that the clustering of industries in this manner would require special site planning and development precautions.

One of the contributing factors to the dispersion of industries is over-zoning. It is estimated that approximately 20,000 acres are presently zoned for industrial uses, with approximately 5,600 acres actually in industrial use at this time. It has been estimated, based on employment projections, that between 1975 and the year 2000, the Planning Area will need only 3,000 additional acres of industrial land or a total of 8,600 acres in industrial use. Therefore, the Planning Area has approximately 133 percent more industrially zoned land at this time than will be needed in the next 25 years. It should be noted that much of the land that is zoned for industrial use is not suited for such uses from environmental and locational standpoints.

The disadvantages of over-zoning which were discussed in relation to commercial uses (Section III, B,2) also apply to industrial use.

D. TRANSPORTATION, COMMUNICATION, AND UTILITIES

This category contains a diverse range of uses from industrial related activities such as the N.C. State Port and power generating plants to utility business offices. As such it is a significant land user comprising a total of almost 5,000 acres in the Planning Area. This acreage represents 20 percent of total developed land. Of this total approximately 2000 acres are located in the Wilmington City Limits and approximately 3000 acres are located in the balance of the Planning Area.

Three of the largest users of land in this category are the New Hanover County Airport, the Sutton Power generating plant, and the North Carolina State Ports Terminal.

E. PARKS AND RECREATION

This category includes both public and private cultural, entertainment, and recreational activities and facilities.

There are 1,408 acres in this category in the Planning Area, with 52.2 percent located outside the City, and 47.8 percent located in the City.

When examining the distribution of the public component of this land use category marked differences between the incorporated and unincorporated parts of the Planning Area can be identified.

Reference to Maps 3 and 4 reveals a relatively dispersed distribution of parks and open space throughout the city, thus allowing greater access by Wilmington's residents. In contrast, public recreational land and open space areas outside the city is concentrated primarily in three areas -- Hugh McRae Park which is owned by New Hanover County, Carolina Beach State Park, and Fort Fisher State Historic Site.

F. OFFICE AND INSTITUTIONAL

This category includes schools, churches, hospitals, business offices not dealing in retail or wholesale trade, and government activities.

Office and institutional land use accounts for 3.1 percent of all developed land within the Planning Area, with 81 percent (623 acres) of the total Planning Area's office and institutional land uses being located within the City. Office and institutional uses occupy 6.7 percent of the developed land in the City and only 0.9 percent outside the City.

The experience of other cities and urban areas indicates that the city, particularly the downtown area, will continue to be the center for office and institutional activities in the future.

G. AGRICULTURE AND FORESTRY

This category includes all cultivated crop fields and cattle grazing fields and forest lands where forestry management principles are conducted.^a

Agriculture and forestry account for 12.2 percent (16,100 acres) of total acreage in the Planning Area. Of this total 10,050 acres are in forest lands and 6050 acres are in cultivated fields and pastures. Maps 3 and 4 show a concentration of this land use in the northern part of the county.

The importance of agriculture in New Hanover County has diminished in recent years as the area has become more urbanized. In 1962, 2.8 percent of the county's workforce was employed in agriculture, but by 1972 agricultural employment fell to only 1.1 percent of total employment. Cash receipts for crop and animal products has also shown a decline. In 1970 farm receipts totaled 2.4 million, but in 1971 receipts totaled only \$2.1 million.

^aCultivated crop fields and grazing pastures obtained from aerial photographs taken in October, 1974. Forest lands identified with the assistance of Durwood Baggett, Agricultural Extension Office.

Even though agriculture has been declining in New Hanover County, area residents have expressed through the Public Participation Program a strong desire to preserve agriculture as a way of life.

IV. SUMMARY

A. MAJOR LAND USE ISSUES

Basically, the survey and analysis of existing land uses in the Wilmington-New Hanover Planning Area has identified six key issues or problems which must be addressed in the land use and development policies adopted by the Wilmington City Council and the New Hanover County Commissioners:

1. A sprawling development pattern

Urban sprawl, or "leapfrog" development, has been shown to be inefficient in the use of scarce land resources, to increase energy consumption, and to increase the costs of public services which must be borne by city and county taxpayers.

2. Neighborhood decline through the encroachment of incompatible uses

The development of incompatible uses such as businesses or industries, within residential areas, have been shown to be an important contributor to the decline of neighborhoods. Such deterioration is extremely costly to the public through a loss of housing units, a loss of tax revenue, and an overall decrease in the quality of life in the community.

3. Strip commercial development

Strip commercial development occurs when a succession of unrelated and unplanned commercial activities develop along a segment of an unlimited access highway. Strip development is undesirable because it tends to encourage land speculation, inflated land values, resulting in a large amount of unproductive land; it depreciates the value of surrounding properties for less intensive uses; and it tends to increase traffic volumes, often necessitating expensive street widenings.

4. Over-zoning

Over-zoning exists when more property is zoned for a particular use than the market demands. It is estimated that the Planning Area has over 200 percent more commercially-zoned land than is needed and over 130 percent more industrially zoned land than needed. Over-zoning to this degree tends to encourage sprawling development patterns; it diminishes the potential that the most desirable commercial and industrial sites will be developed; and it removes land from other productive uses.

5. Drainage

Many artificial land drainage systems which are required for development in most areas of New Hanover County have not been successful in removing water runoff and in lowering the water table. The result has been standing water in many subdivisions, malfunctioning septic tanks, and increasing maintenance costs. In addition, studies have indicated that extensive artificial drainage systems may have a serious negative impact on productive estuarine waters.

6. Septic tanks

In a large number of subdivisions, septic tanks have been developed at excessive densities or in unsuited soils resulting in a high incidence of failures. In addition to the obvious health hazards, malfunctioning septic tanks make a significant contribution to the pollution of the Planning Area's surface waters, and they represent an economic liability to the property owner through the requirement for frequent maintenance.

B. ROLE OF LAND USE AND DEVELOPMENT CONTROL ORDINANCES

Considering the extent of existing land use problems in the Planning Area and the fact that zoning ordinances and subdivision regulations are in force throughout the area, it seems appropriate in conclusion to examine the role of these ordinances in guiding development, in protecting neighborhoods, and in

protecting the environment. More specifically, why have these ordinances been ineffective in preventing the land use problems currently experienced by the Planning Area?

For several years, the effectiveness of zoning and subdivision ordinances have been criticized. However, in many instances, the criticism has been directed toward the ordinances themselves and their administration, and these are not the proper targets of concern. Ordinances are merely the tools of public policy, and where the policy basis for ordinances is weak, the ordinances themselves will necessarily be weak and ineffective.

The Wilmington City Council and the New Hanover County Commissioners adopted zoning and subdivision ordinances several years ago. Upon examination, however, it appears that these ordinances were more the result of crisis situations than the result of any comprehensive public policies concerning land development. The outcome has been a set of ordinances which are weak, which are inconsistent and often conflicting, and which contain some serious loopholes.

The New Hanover County subdivision ordinance provides an example. The ordinance states that the regulation of the subdivision of land in the county is necessary to create "conditions essential to public health, safety, and general welfare"; however, provisions of the ordinance permit developers to avoid meeting the minimum development standards by allowing the subdivision of land through procedures known as metes and bounds.

The frequency of zoning ordinance amendments provides a further example. Over the past five years the text and maps of the city and county zoning ordinances have been amended a total of 493 times. This would indicate that the zoning ordinances are not actually implementing any clear public policy directed toward land development; rather, the policy seems to be to have a zoning ordinance.

Clearly then, to be effective in preventing the continued creation of land use problems, the Planning Area's land use and development control ordinances

must be revised and up-dated so that they reflect rational and consistent policies formulated through the land use planning process. Further, these ordinances, once revised, should be amended only when it is explicitly shown that (1) an error was made when the ordinances were adopted, or (2) that conditions have changed sufficiently since adoption to merit amendment.

**wilmington -
new hanover
comprehensive
planning program**

**TECHNICAL REPORT
4**

**estimates of
future land needs**

APRIL, 1976

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Appendix

I. INTRODUCTION

The purpose of this report is to present estimates of the amount of developed land which will be required to meet the needs of the Wilmington-New Hanover Planning Area's growing population and work force. These estimates are intended both to illustrate the impact of a growing population on the area's land resources and to provide technical information for the development of a detailed land use plan.

It is important to emphasize that projected land needs presented in this report are estimates only and that their accuracy may vary widely. As development practices, technology, and public attitudes and values change, the actual land use requirements may also change significantly.

II. ESTIMATES OF GROSS LAND NEEDS

Two levels of detail have been used in estimating future land needs. At the first level, an attempt was made to simply estimate the gross land needs in three categories*:

- (a) Urban areas such as those found in the City of Wilmington and its suburbs. In these areas expected population densities would be at least 2000 persons per square mile, requiring a full range of public services.
- (b) Rural communities, such as Ogden or Castle Hayne, where population densities would be much lower, using 640 persons per square mile as a rule of thumb. Extensive public services probably would not be required in these areas.
- (c) Dispersed rural areas where lot sizes would be extremely large, averaging 320 persons per square mile, and where only minimal public services would be provided.

Based on an evaluation of past trends and the existing distribution of population, it is estimated that approximately 75 percent of the Planning Area's future population will be accommodated in urban areas, 15 percent in rural communities, and the remaining 10 percent dispersed throughout the rural areas of the county. Using these estimates the following table illustrates the amount of land needed in each general category.

According to these estimates, approximately 55 square miles of land will be required to support the Planning Area's expected twenty-five year population growth. Focusing on the urban and rural community categories which are most sensitive to land capability constraints, approximately 36 square miles of land suited for development will be required during the twenty-five year planning period.

*Analysis at this level is required by the Coastal Resources Commission's "Guidelines for Local Planning Under the Coastal Area Management Act of 1974".

Table 1

SUMMARY OF GROSS LAND NEEDS

Category	1975-1985		1985-1995		1995-2000		1975-2000	
	People	Land	People	Land	People	Land	People	Land
Urban	15,400	8 Sq. Mi.	18,750	9 Sq. Mi.	9,750	5 Sq. Mi.	43,900	22 Sq. Mi.
Rural Community	3,100	5 Sq. Mi.	3,750	6 Sq. Mi.	1,950	3 Sq. Mi.	8,800	14 Sq. Mi.
Dispersed Rural	2,100	7 Sq. Mi.	2,500	8 Sq. Mi.	1,300	4 Sq. Mi.	5,900	19 Sq. Mi.
Total	20,600	20 Sq. Mi.	25,000	23 Sq. Mi.	13,000	12 Sq. Mi.	58,600	55 Sq. Mi.

Source: Wilmington-New Hanover Planning Department

III. DETAILED LAND NEEDS ESTIMATES

At the second level of detail, estimates of the specific land needs have been prepared for the primary users of land -- residences, industries, and commercial activities. These estimates are based on three considerations:

- (1) A statistical analysis of the amount of land required to support the Planning Area's current population;
- (2) Accepted planning guidelines for estimating land needs;
- (3) Population and employment projections.

In addition, the estimates based on these factors have been increased by 50 percent to allow adequate flexibility for the proper operation of the real estate market and to account for land which will be held off the market indefinitely.

A. INDUSTRIAL LAND NEEDS

Estimating the amount of land required for industrial uses in the future is very difficult. There is great variability in the site size, shape, and location requirements among various types of industries. In addition, specific firms within major industrial groupings may have widely varying land needs. Even though accurate estimates are difficult, it is important to approximate industrial land needs so that adequate land in appropriate locations can be set-aside for future use.

Estimates of the Planning Area's industrial land needs have been developed using local information on the ratio of land to workers for major industrial groups and employment projections for each of these groups. The estimates have also been aggregated to show land needs in the extensive and intensive classifications which were discussed in the first part of this report.

The estimates which are summarized in Table 2, indicate that the county's extensive industries will require approximately 2690 acres over the next 25

years, while intensive industries which are smaller land users will require 145 acres. Overall, the county will require 2835 acres of industrial land between 1975 and 2000, or an average of almost 110 acres per year. Considering the requirement for market flexibility, a total of 4,200 acres of extensive land and 220 acres of intensive land will be required between 1974 and 2000. These estimates, of course, assume that current land to worker ratios will persist into the future. (Table 1 in the Appendix illustrates the county's current industrial land/employee ratio and the employment projections for major industry groups.)

Table 2

New Hanover County Industrial Land Needs -- 1974-2000

Industry type	1974-80	1980-90	1990-2000	1974-2000	
				Actual Acres Needed	Acres Required For Market Flexibility
Extensive	650	1070	970	2690	4200
Textiles	40	60	60	260	390
Lumber and Wood	60	100	90	250	380
Fabricated metals	350	580	530	1460	2200
Chemicals	130	230	200	560	840
Stone, clay, and glass	70	100	90	260	390
Intensive	35	57	53	145	220
Apparel	6	11	10	27	40
Machinery	14	22	20	56	84
Food	9	15	14	38	60
Printing	3	4	4	11	16
Miscellaneous	3	5	5	13	20
Total	685	1127	1023	2835	4420

Source: Wilmington-New Hanover Planning Department

B. COMMERCIAL LAND NEEDS

Since studies have shown that there appears to be only a slight correlation between the amount of land in commercial land uses and total population, the

estimates of total commercial land needs are based on projected retail sales and projected trade sector employment. These variables are felt to more accurately reflect the Planning Area's commercial needs because it serves a large primary trading area consisting of New Hanover, Brunswick, Pender, and Columbus Counties, as well as an extensive secondary trading area.

As expected, there is a significant gap between the needs estimates based on trade employment per acre and retail sales per acre (Table 3); however, in the absence of any data which favors one projection over the other, an unweighted average of the two has been used as an estimate of total commercial land needs.

As indicated in Table 3, the Planning Area will require approximately 2600 additional acres of commercial land by the year 2000. This land must be allocated among four major commercial activities -- regional centers, community centers, neighborhood centers, and highway service areas.

Table 3

Alternative Estimates of Commercial Land Needs, 1975-2000

Estimate Basis	Additional Commercial Area Needed (acres)				
	1975-80	1980-90	1990-2000	1975-2000	
				Actual Acres Needed	Acres Required For Market Flexibility
Retail Sales/acre	371	836	838	2047	3100
Trade Employment/acre	279	537	591	1407	2100
Average estimate	325	700	700	1725	2600

Source: Wilmington-New Hanover Planning Department

The regional shopping centers will have adequate facilities to offer full depth and variety in comparative shopping. Each center will contain more than 500,000 square feet of sales area and must be supported by a minimum of 100,000 people.

The community shopping areas, in addition to providing convenience goods and services found in the neighborhood shopping areas, will also provide a wide range of shopping facilities which will permit some degree of comparative shopping. The community shopping areas should be designed to service a population of between 20,000 and 70,000 and have from 50,000 to 150,000 square feet of commercial floor space. Community shopping areas should be located at the intersection of major arterial roads.

The neighborhood shopping areas will provide for a minimum of 5,000 population and should contain from 15,000 to 50,000 square feet of commercial floor space. The primary purpose of the neighborhood shopping area is to provide convenience goods and services to individual neighborhoods. Therefore, the neighborhood shopping area is limited in its scope of commercial facilities to such activities as retail sale of food, drugs, etc., and the operation of personal service establishments such as laundry, dry cleaning, barbering, etc. Neighborhood shopping areas ideally should be located at the intersection of arterial and collector streets.

The highway oriented service areas should contain only those establishments oriented toward providing services for automobile traffic. These service establishments would include motels, restaurants and gasoline service stations. Such a service area would be located on a major arterial route.

C. RESIDENTIAL LAND NEEDS

At the present time, there are approximately 11,080 acres of land in residential uses in the Planning Area with an average gross density of 2.7 families per acre. Although residential densities are higher within the City of Wilmington, it is felt that an overall density of 2.5 families per acre is a useful guideline for determining total residential land needs.

According to population forecasts for New Hanover County, the population will increase from a current level of 92,000 to 151,000 in the year 2000. Assuming an average family size of 2.5 persons in the future, this amounts to an increase of 23,600 families. By applying the gross density guideline of 2.5 families per acre, approximately 9400 acres of land will be needed for residential uses over the next 25 years.

How this land will be distributed among low, moderate, and high density residential uses is dependent upon several factors -- public values and attitudes, economic conditions, environmental capability, private development decisions, and others. However, should current development patterns continue, it is possible to approximate the number of acres needed for various residential densities.

A recent study of residential land uses in the Planning Area indicates that residential development generally occurs in three density classifications: suburban-rural densities, moderate urban densities, and high urban densities. These density classes and their yield of persons and dwelling units per acre is illustrated in Table 4.

By assuming that the future distribution of residential development between the three classes will be 25 percent suburban-rural, 50 percent moderate urban, and 25 percent high urban, estimates of future land needs in each class can be made. These estimates are summarized in Table 5.

Table 4
Existing Residential Density Classes -- New Hanover County

Density Class	Range of d.u.'s per acre	Avg. # d.u.'s per acre	Range of persons per acre	Avg. # persons per acre
Suburban-rural	0-2	1	0-5	2.5
Moderate urban	3-6	4.5	7.5-15	11.25
High urban	7-12	8.5	17.5-30	23.75

Source: Wilmington-New Hanover Planning Department

Table 5

Estimate of Residential Land Needs, 1975-2000

Density Class	Avg. d.u.'s per acre	Families to be accomodated	Actual Acres Needed	Acres Required For Market Flexibility
Suburban-rural	1	5,900	5,900	8,800
Moderate urban	4.5	11,800	2,600	3,900
High urban	8.5	5,900	700	1,000
TOTALS	---	23,600	9,200	13,700

Source: Wilmington-New Hanover Planning Department

D. SUMMARY

Table 6 provides a summary of the Planning Area's land needs for the 1975-2000 planning period. The summary shows that approximately 21,000 acres, or 33 square miles, will be needed for industrial, commercial, and residential uses alone. Space must also be provided for a variety of additional uses such as recreation, open space, and highways.

Table 6

Summary of Future Land Needs

Land Use Category	Number of Acres Required to Insure Market Flexibility 1975-2000
Industrial	4,420
Extensive	4,200
Intensive	220
Commercial	2,600
Residential	13,700
TOTAL	20,720

Source: Wilmington-New Hanover Planning Department

APPENDIX

TABLE 1

ACREAGE AND EMPLOYEE INVENTORY OF LOCAL INDUSTRIES

	Average ^a Acreage	Average No. Employees	Reporting Units	Total Acres	Total Employees	Employees Per Acre
Food and Kindred Products	1.8	41.9	18	32.4	754	23.3
Textile Mill Products	98.0	750. ^a	2	196.0	1,500	7.7
Apparel and Other Textile Products	4.3	233.	8	34.4	1,866	54.2
Lumber and Wood Products	11.6	33.3	24	278.4	902	3.2
Printing and Publishing	1.0	27.4	11	11.0	301	27.4
Chemicals and Allied Products	102.9 ^b	190.	13	1,337.7	2,474	1.8
Stone, Clay, and Glass Products	522.8	34.4	8	4,182.4	275	.1
Fabricated Metal Products	56.8	103.	7	397.6	722	1.8
Machinery, Except Electrical	8.5	69.	8	68.0	554	8.1
Electrical Equipment and Supplies	29.8	178.5 ^a	2	59.6	357	6.0
Totals			101	6,597.5	9,705	1.5

^aData collected from tax records (all other data from County Business Patterns - 1972)

^bLand currently used in production by Hercules figured only in average - not total holdings of land by Hercules.

APPENDIX

TABLE 2

SECTOR WORKFORCE EMPLOYMENT FORECAST: 1972-2000
 MANUFACTURING
 NEW HANOVER COUNTY

Sector	1972		EMPLOYMENT		
	Employment	Percent	1980	1990	2000
Textiles	1360	13.3	1649	2141	2580
Lumber and Wood	800	7.9	980	1272	1533
Fabricated Metals	2890	28.4	3522	4572	5510
Chemicals	1110	10.9	1352	1755	2115
Stone, Clay, Glass	280	2.8	347	451	543
Total Extensive	<u>6440</u>	<u>63.3</u>	<u>7850</u>	<u>10191</u>	<u>12281</u>
Apparel	1590	15.6	1934	2512	3026
Machinery	500	4.9	608	789	951
Food	970	9.5	1178	1530	1843
Printing	310	3.1	384	499	601
Miscellaneous	<u>350</u>	<u>3.4</u>	<u>422</u>	<u>547</u>	<u>660</u>
Total Intensive	<u>3720</u>	<u>36.7</u>	<u>4526</u>	<u>5877</u>	<u>7081</u>
TOTAL	10160	100	12376	16068	19362

Source: Technical Report Number 1: Human and Economic Resources

**wilmington -
new hanover
comprehensive
planning program**

**TECHNICAL REPORT
5**

**analysis of
growth alternatives**

APRIL, 1976

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Appendix I: Review of Population Projections

Appendix II: Cost Estimating Procedures for Public Services

I. INTRODUCTION

A. NATIONAL TREND TOWARD GROWTH MANAGEMENT

The traditional ethic of growth is being challenged in many communities throughout the United States. The premise that growth and progress go hand-in-hand is no longer universally accepted.

The costs and benefits of growth are emerging as major public issues. Misgivings over growth with its attendant consequences -- rapid consumption of land, alteration of the environment, and increasing demand for public services -- have led some communities to develop public policies which affect the nature and extent of local growth. The growth management policies of communities such as Ramapo, New York and Petaluma, California have been challenged and upheld by the courts.

At the same time, this emerging trend toward local growth management has not been without strong opposition. Dissent over growth controls and limits has been expressed by various business interests, property owners, builders, and advocates for the disinfranchised: the poor, minorities, the underemployed, and the aged.* Most often, the basis for opposition has been that the long-range impacts of growth management have not been sufficiently evaluated and that the overall impact of growth limits on the general welfare of the community may be negative.

The predominant growth attitudes among some individuals and groups still include the following:

1. growth stabilizes or improves the local tax situation by broadening the tax base and reducing per capita tax burdens;

*Randall W. Scott, ed., Management and Control of Growth, Vol. I (Washington, D.C.: The Urban Land Institute, 1975), p. 2.

2. most growth pays its own way;
3. new development brings a broader range of goods and services to the community.
4. growth improves local wage levels and brings a greater choice of job opportunities.
5. growth brings a greater selection of housing types and locations;
6. development and expansion eventually result in improved community facilities such as fire and health services, schools, and so forth.

Many growing communities, however, have found that these premises of growth are not necessarily true. Growth has brought higher tax bills and a widening gap between service needs and service delivery; new shopping centers have drawn customers away from shopping areas, leading established business interests to question the desirability of growth; and perhaps the most widespread concern linked to growth has been the lowered quality of life -- a loss of small town atmosphere or a loss of neighborhood identity.

B. NEED FOR LOCAL GROWTH POLICIES

In recent years, Wilmington and New Hanover County have had informal, unstated policies regarding population growth. Neither unit of government has exercised measurable control over growth, and there have been no clear statements concerning the amount of growth desired, the type of growth desired, or where growth should occur.

The choice, instead, has been to focus on preserving the living environment of the area's residents by attempting to insure that growth and accompanying development has minimal impact on existing developed areas and by attempting to provide needed public services and facilities in as timely a manner as possible. It is fair to say that one of the major faults in this approach to growth has been a widening gap between public service needs and service delivery. Water

supply, sewage treatment and disposal, drainage, and recreation are primary examples of service short-falls.

The need to close the gap between existing service needs and services delivered is, in itself, a strong argument for a formal public growth policy. At a recent meeting in the Murraysville-Gordon Road Planning District, one resident stated that "we must take care of the needs of our current residents before encouraging more people to move to the county." Similar concerns have been expressed by residents of other areas.

In addition to these locally demonstrated needs, the Coastal Resources Commission also requires that local governments develop growth policies as a part of the Coastal Area Management program. The Commission has not specified what type of policy should be adopted, only that the locality's growth objectives be clearly stated and that policies be developed for achieving these objectives.

The growth policies, themselves, need not be complex. Basically, they should contain clear, concise statements of the community's growth objectives and the policies or means to be used in achieving these objectives. Their content should address the three fundamental issues of growth:

1. Quantity. How much growth is desirable for the community?
2. Location. Where should development take place -- close to existing developed areas or dispersed throughout the Planning Area?
3. Type. Does the community want to build an economy based on recreation, or does it want manufacturing activities? Do the people want more apartments or more single-family homes? What about shopping facilities?

The purpose of this technical report is to provide the citizens of the Wilmington-New Hanover Planning Area and their elected officials with information which can be used to facilitate the development of a policy regarding the area's growth. It is emphasized that much of the information contained in this report is tentative and subject to significant errors in

some cases -- particularly in the examination of service costs. In all cases, however, the staff has made every effort to apply cost and benefit assumptions equally to all alternatives.

C. STUDY OUTLINE

This study contains two principle parts. The first addresses the questions of "how much" and "where" should growth occur. It analyzes the affects of alternative population growth rates and alternative development patterns on the local economy, the costs of public services, and the land resources of the Planning Area.

The second part deals with the third major element of growth policies -- what type of growth should the Planning Area encourage? It is based on a detailed analysis of the local economy which makes it possible to forecast the impact of economic development alternatives on the economy. In general terms, it identifies the industrial sectors having the greatest overall impact on the economic well-being of local residents.

II. ANALYSIS OF THE AFFECTS OF GROWTH AND DEVELOPMENT ALTERNATIVES

A. ALTERNATIVES

Six growth and development alternatives for the Wilmington-New Hanover Planning Area have been defined in terms of two variables: projected total population and the spatial distribution of development generated by population growth. For total population the alternatives assume the three population growth levels identified in Technical Report #1, and for density the alternatives assume that each population level will be accommodated in a dispersed or compact development pattern. The six alternatives are described in Table 1.

TABLE 1
GROWTH AND DEVELOPMENT ALTERNATIVES

ALTERNATIVE	ASSUMPTIONS	
	POPULATION YEAR 2000	DWELLING UNIT DENSITY
Low-Compact	122,800	2 DU's per gross acre
Low-Dispersed	122,800	.5 DU's per gross acre
Moderate-Compact	140,300	2 DU's per gross acre
Moderate-Dispersed	140,300	.5 DU's per gross acre
High-Compact	151,000	2 DU's per gross acre
High-Dispersed	151,000	.5 DU's per gross acre

B. MEASURES OF AFFECTS

In analyzing the effects of population growth, an attempt has been made to measure the costs and benefits of growth which accrue to the residents of the Planning Area. It would be very difficult, and perhaps impossible, to specify and measure all of the costs and benefits of growth. Such an analysis is limited, first, by the availability of information and, second, by the fact that many costs and benefits cannot be measured. For example, it would be very

difficult to realistically measure, in quantifiable terms, the actual costs of increased traffic congestion resulting from population growth. Therefore, it has been necessary to utilize indicators of the costs and benefits of growth.

For the purposes of this study, benefits have been measured in terms of the impact of growth on the local economy. Four elements have been considered:

- (1) total employment which is a measure of the diversification of the local economy and, thereby, an indicator of the range of employment options available to local residents;
- (2) total manufacturing employment which is an indicator of the amount of money flowing into an area;
- (3) per capita income which is a measure of economic well-being, although it does not indicate distribution of income; and
- (4) retail sales which is an indicator of the vitality of the trade sector employing 20 percent of the Planning Area's workforce, and which is also an indicator of the selection and types of goods available to the resident.

The costs of growth have been measured in terms of the cost of providing public services and the impact of population growth on the Planning Area's land resources. Six public service areas have been considered:

- (1) water
- (2) sewerage
- (3) solid waste management
- (4) fire protection
- (5) police protection
- (6) highways

A variety of factors could be used to evaluate the impact of growth on the local government. However, costs were selected because they are readily understood; they are easily compared; and, probably most important, they are of prime interest to citizens and elected officials alike.

The impact of growth on the Planning Area's land resources has been analyzed in terms of the amount of land needed to accommodate the three population levels. This is an important measure. It indicates the development pressure which will be exerted on the county's marginal lands, as well

as the reduction in land use alternatives available to future residents. If, for example, 57,000 additional people require 30 square miles of land and only 22 square miles of suited land are available for development without improvement, it would indicate that either environmentally marginal land must be developed or that there must be a change in life-style in the form of more high density apartments and condominiums on environmentally suited land.

C. METHODOLOGY

1. Measurement of Impacts on the Local Economy

Total employment and manufacturing employment have been derived from the three population projections using projections and assumptions concerning the percent of total population who will be employed and the unemployment rate. Since these factors do not vary appreciably, they can be projected with an acceptable degree of accuracy.

An analysis of past trends in incomes and employment reveals that per capita income is highly correlated with total manufacturing employment. Therefore, using this relationship, per capita income at the three population levels has been projected based on total manufacturing employment.

A similar analysis reveals that retail sales and total population are also highly correlated. Therefore, projected total population has been used to project retail sales.

It is understood that there are inherent dangers in long-range projections based on assumptions that past trends will remain the same in the future. Therefore, this information should only be used for the purpose of comparing the relative impact of growth alternatives.

2. The Measurement of Impacts on the Provision of Public Services

The analysis of the impact of growth on the costs of public services

relies heavily on a report by the Research Triangle Institute.* This report is designed primarily to provide a basis for evaluating alternative strategies for the allocation of public funds, and thus, the cost-estimating relationships contained in the report are ideal for the purpose of analyzing the impacts of population growth. The study permits estimation of the impact of total population and the impact of population distribution (development density). An outline of the assumptions and formulas used in this evaluation are included in Appendix II.

3. The Measurement of Impacts on Land Resources

Estimates of specific land needs were prepared for the primary users of land -- residences, industries, and commercial activities. These estimates are based on three considerations:

- (1) a statistical analysis of the amount of land required to support the county's current population;
- (2) accepted standards for estimating land needs; and
- (3) population and employment projections.

In addition, the estimates based on these factors have been increased by 50 percent to allow adequate flexibility for the proper operation of the real estate market.

These estimates of total land need have been compared with an estimate of available developable land. The impact of growth on land resources has been expressed as a percent of available developable land required to meet the needs of each population growth level.

D. RESULTS OF ANALYSIS

The results of the analysis of growth alternatives are presented in Table 2. The results show that there are significant differences between the costs

*Research Triangle Institute, Center for Development and Resource Planning, Estimating Costs of Public Services, Research Memorandum RM-26U-776-1-2, May 1974.

TABLE 2

SUMMARY OF GROWTH IMPACT ANALYSIS

IMPACT	GROWTH AND DEVELOPMENT ALTERNATIVES					
	LOW GROWTH		MODERATE GROWTH		HIGH GROWTH	
	COMPACT	DISPERSED	COMPACT	DISPERSED	COMPACT	DISPERSED
Public Service Costs						
Water	\$ 3,900,000	\$ 5,600,000	\$ 6,300,000	\$ 8,800,000	\$ 7,600,000	\$ 10,800,000
Sewerage	7,000,000	24,800,000	11,200,000	39,200,000	13,440,000	49,200,000
Solid Waste	98,000	112,000	157,500	180,000	196,000	224,000
Police Protection	244,000	244,000	392,000	392,000	488,000	488,000
Fire Protection	492,000	492,000	791,000	791,000	984,000	984,000
Highways	17,600,000	34,200,000	28,400,000	54,900,000	35,500,000	68,300,000
Total	\$29,334,000	\$65,448,000	\$47,240,000	\$104,426,300	\$58,208,000	\$129,996,000
Total Employment	60,000		69,000		74,000	
Manufacturing Employment	16,000		18,000		19,000	
Retail Sales	\$1.06 Billion		\$1.39 Billion		\$1.60 Billion	
Per Capita Income	\$7,000		\$8,300		\$9,100	
Percent of Buildable Land Consumed	29%		46%		58%	

Source: Estimating Costs of Public Services, Research Memorandum RM-26U-776-1-2, Research Triangle Institute, Center for Development and Resource Planning, May, 1974.
Wilmington-New Hanover Planning Department.

and benefits between each of the six alternatives.

The benefits of growth as measured by its impacts on the local economy appear to increase as total population increases. For example, estimated per capita income at the high growth level is \$2,100 higher than the low population growth level, a difference of 30 percent. Similarly, retail sales at the high growth level are 51 percent higher than those estimated at the low growth level.

The analysis of the costs of growth show similar trends. Considering only total population and not the distribution of population the costs of providing public services increases as growth increases. The per capita costs of services in the six categories analyzed remain relatively constant for the three growth levels; however, at each population level the per capita cost for dispersed development is more than twice as high as compact development. For example, the per capita cost for servicing the "low-dispersed" growth alternative (\$533) is 1.4 times greater than the per capita costs for servicing the "high-compact" growth alternative (\$385).

An analysis of the county's land resources capability to support development indicates that there is an ample supply of environmentally suited land, provided necessary improvements are accomplished, to support the county's projected "high" population growth level and its attendant land needs. Therefore, current and future development on environmentally marginal and sensitive land is not necessary nor is the encouragement of a slower growth rate necessary to accommodate future land needs. A final estimate indicates that the "high" population projection would require 58 percent of available developable land; the moderate population level would require 46 percent; and, the low population level would require 29 percent.

This study has attempted to analyze some of the measurable impacts of growth alternatives on the residents of the Planning Area. As stated earlier

the intent of this analysis has been to compare growth alternatives in relative terms and not to develop absolute estimates of the costs and benefits of any one alternative.

A further caution is necessary. There are as many, if not more, factors both quantitative and qualitative, left out of this analysis as are included. Many of these factors relate directly to the values and desires of the Planning Area residents. They relate to considerations such as the social and political acceptability of land use and growth controls and a desire for the continuation of the present way-of-life. These factors must be considered in formulating growth policies for the future.

III. INDUSTRIAL DEVELOPMENT IMPACT

In evaluating future growth alternatives one major consideration is what types of industries and businesses should be expanded. From a public viewpoint one of the main questions is which industries will have the greatest impact on improving the income of the local residents. Determining an adequate answer to this question requires a detailed examination of the economy of the Wilmington Metropolitan Area (Wilmington SMSA). To accomplish this task a sophisticated technique of economic analysis called "Input-Output Analysis" was employed. Basically, Input-Output Analysis is a systematic method of analyzing transactions between the different sectors of the economy. Sectors refer to groupings of economic activities which produce similar products or provide similar services. For example, the chemical sector includes manufacturers of industrial chemicals, synthetic fibers, agriculture chemicals, and etc. The industry groupings used in this study are the same as that used by the North Carolina Employment Security Commission for reporting workforce estimates. Transactions between sectors are expressed in the dollar value of each sector's purchases (inputs) from other sectors and the value of its sales (outputs) to other sectors.

In the applications of Input-Output to the local economy, three types of transactions were considered:

1. Sales of goods and services by local sectors to markets outside the local economy (exports).
2. Sales and purchases between sectors within the local area.
3. Purchases by local establishments from sources outside the local economic area (imports).

The nature of each of these transactions has important implications for development of the area's economy. The sale or export of goods and services

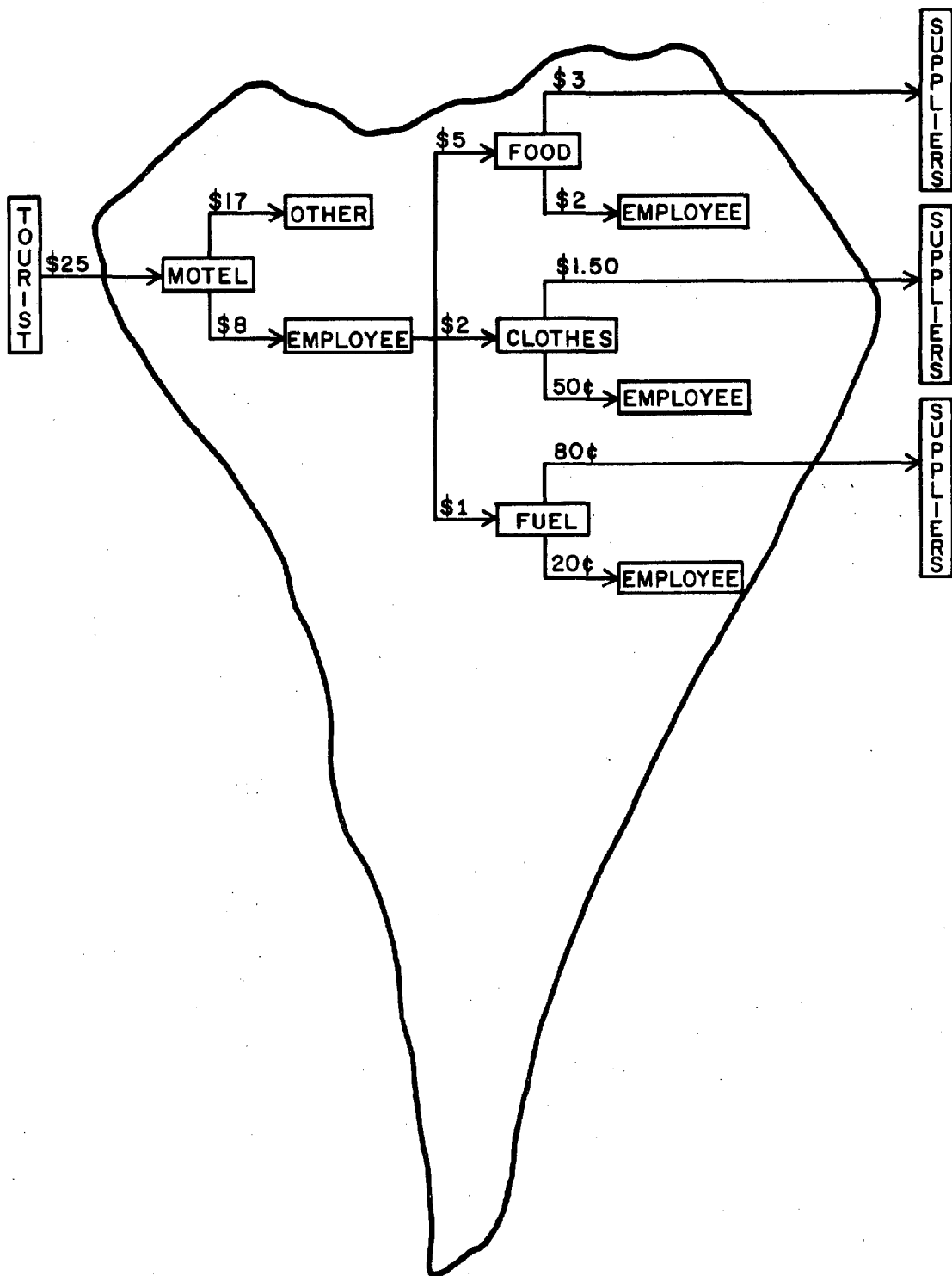
produced by local industries to markets outside the local area is the major source for introducing "new money" into the economy. Most economists agree that growth or decline in the volume and value of exports is the most important factor determining the economic growth or decline of an area. The impact of exporting sectors on the income of local workers was a major consideration in this study.

Once new money enters the economy through the export of goods or services it is distributed among several sectors through sales and purchases. These transactions have the effect of multiplying the money, thereby increasing its impact on the income of the local workforce.

Since all the goods and services required for the economy to function are not available locally, some must be purchased from outside sources. These purchases (imports) represent a flow of money out of the local economy and thereby represents a loss of potential economic benefit to local residents. Generally the loss of money through imports can be minimized by diversifying the industrial structure of the economy so that it can better support itself.

The flow of money as described above is illustrated in Figure 1. The hypothetical diagram shows the partial disposition of income generated by a tourist expenditure for lodging. This transaction introduces "new money" into the economy through the export of a service - providing lodging. The diagram shows that in addition to the direct impact of the "new money" on the motel employees (part of the service sector), it also has indirect impacts on several other industries - food, clothing, and utilities - before finally "leaking" out of the economy to suppliers. Thus expansion of economic activity in any sector not only affects the income generated in that sector but in other sectors as well.

FIGURE 1
FLOW OF MONEY THROUGH THE ECONOMY



The flow of money through the economy is important in formulating economic development policies. Decision-makers need to know what impact developments in different sectors will have on the income of the local workforce. To illustrate these impacts a 10 percent expansion in exports (the source of new money) of the SMSA economy was projected using input-output techniques. A fixed percentage change in exports was assumed in order to make a valid comparison of each sector's ability to generate additional income. The task involved a series of projections computed separately for each sector. In each projection, the value of exports for one sector was increased 10 percent while exports for all other sectors were held at their 1972 levels. Projections were not computed for the following sectors:

1. Lumber and wood processing.
2. Stone, clay and glass producers.
3. Construction.
4. Domestic and self-employed persons.

These sectors consist mainly of local oriented businesses which have little or no export trade.

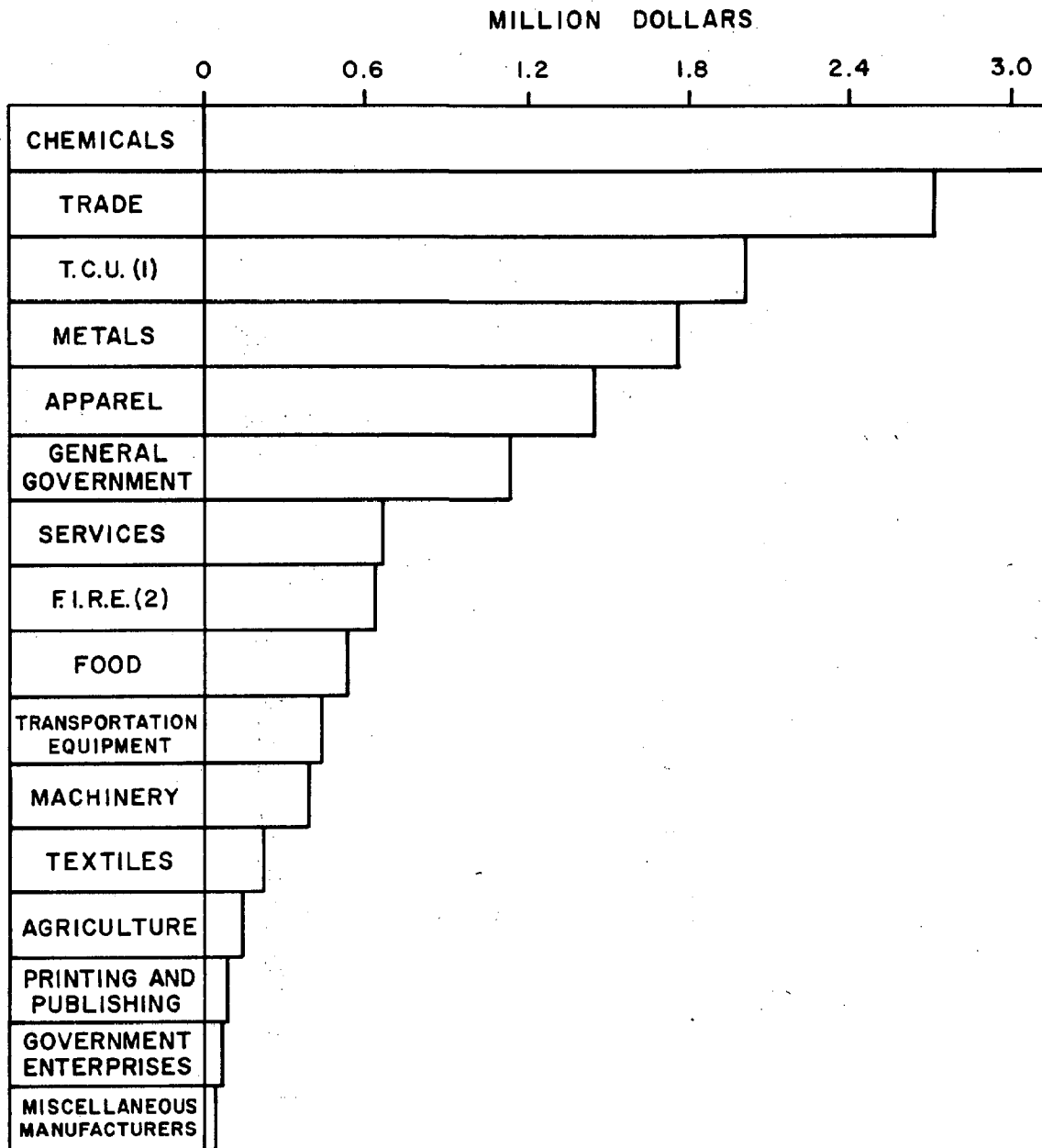
Figure 2 depicts the total increase in income resulting from expansion in the sectors. The value shown for each sector is the income generated for workers in that sector plus the amount generated indirectly in other sectors.

This information should be helpful in evaluating development alternatives, however, other factors such as environmental impacts, public facilities requirements, land needs and tax revenues must also be considered.

Although the chart shows the impact of increasing exports, the same relationships hold for cutbacks. Thus the chart can be used to project the loss in income resulting from a 10 percent cutback in exports by the sectors.

FIGURE 2

**PROJECTED INCREASE IN INCOME
FOR SMSA WORKFORCE
(Due to a ten percent increase in sector exports)**



(1) T.C.U.—Transportation, Communication and Public Utilities

(2) F.I.R.E.—Finance, Insurance and Real Estate

IV. IMPACT OF GROWTH ON KEY FACILITIES

In the Coastal Resources Commission's publication, "Guidelines for Local Planning", it is specifically required that the impact of population growth on existing community facilities and the demand for new facilities resulting from growth be analyzed. Specific services and facilities to be considered are water and sewer services, school facilities and basic transportation facilities.

It is the opinion of the Planning Staff that the preceding discussion of growth alternatives in terms of their impact on public service cost is sufficient to insure that the citizens and elected officials of the Wilmington-New Hanover Planning Area are fully apprised of the impact of growth. However, to insure that state planning guides are met the following descriptive analysis of the impact of growth on community facilities has been prepared. It is important to emphasize that this analysis is only intended to provide an indicator of the magnitude of overall impact of population growth on community facilities. A detailed analysis of public service and facilities needs will be undertaken in a later phase of the Comprehensive Planning Program.

A. WATER SUPPLY

The Planning Area's domestic and industrial water needs are currently being met by two basic sources:

- (1) The City of Wilmington is served by a public treatment and distribution system which takes its raw water supply from the Cape Fear River some thirty miles above the city.
- (2) The unincorporated areas of the county are dependent upon ground water, either from individual wells or from private distribution systems.

Recent engineering studies indicate that both of these water sources are limited. First, although an ample quantity of ground water is available

in most areas of the county, its quality is often poor. The ground water supply is also threatened by salt water intrusion from increased pumping and by pollution from septic tanks located on unsuited soils. With these factors in mind, the engineering report concludes that an extensive county-wide water treatment and distribution system will be required to insure an adequate supply of safe drinking water will be available for the area's growing population. The plan recommends using Wilmington's existing water system as the basis for the county-wide system.

However, the Wilmington system is also limited. It is currently utilized to its maximum capacity of 13 MGD. Assuming that the average daily domestic and industrial water demand is 250 gallons per person and that 75 percent of the projected year 2000 population (113,000 persons) is served by the system, it would be necessary to expand the city's system to more than double its existing capacity (28 MGD). In addition, the system's existing raw water supply line, rated at a capacity of 12 MGD, would require expansion.

B. SEWAGE TREATMENT

The treatment and disposal of wastewater, or sewage, is one of the most serious land use problems which have been identified in the Planning Area. In the unincorporated areas of the county, there are four private "package" sewage treatment plants in operation; however, most businesses and residences are dependent upon septic tanks. Unfortunately, both of these methods are causing problems. First, New Hanover County is not well-suited for the use of septic tanks. The Soil Conservation Service estimates that septic tank failures can be expected in approximately 78 percent of the county's land area. This estimate is born out by the fact that at least 19 residential subdivisions are currently experiencing problems from septic tanks.* Second,

*Henry Von Oesen and Associates, "Greater Wilmington 201 Facilities Planning Study, December 1975 (draft).

the package treatment plants are also causing problems in that their effluents have forced the closing of shell-fishing waters.

Engineers who are studying the sewage problems have determined that a centralized sewage collection and treatment system is required to alleviate problems stemming from current development and to prevent serious environmental damage from expected population increases. They recommend the connection of this system to Wilmington's existing sewage treatment plants which would require substantial increases in the capacities of these facilities.*

C. HIGHWAY SYSTEM

An examination of the Planning Area's highway system indicates that, with the exception of U.S. 421, all of its major roads are currently carrying traffic volumes which are either at or near their design capacity. In addition to extensive improvements in existing facilities which will be needed to accommodate the area's projected traffic volumes:

1. A circumferential freeway system.
2. A four-lane arterial running along the northern limit of Wilmington from U.S. Route 74 in the east to U.S. Route 117 in the west.
3. A major four-lane arterial to the north of and parallel to Wrightsville Avenue.
4. A north-south connector from U.S. Route 117 north of Wilmington to Grace Street in the central city.
5. A new major north-south travel route in the city.

These new facilities, along with required up-grading of existing facilities, have been projected to cost more than \$100,000,000 over the next 20 years.**

*Ibid.

**Wilbur Smith and Associates, "Wilmington Area Transportation Study", 1972.

D. SCHOOLS

The New Hanover County Board of Education provides public educational services to the entire county. An analysis of the county's public schools revealed a current overall capacity for 26,305 students and a current enrollment of 20,435 students. The excess capacity of 5,870 represents a current utilization rate of approximately 78 percent. Three new schools are scheduled to be in operation by September, 1976 raising the capacity to 29,269 students. School enrollment projections were made using the appropriate school age category from the population study. On a total classroom basis, no additional classrooms are required until after 1990. A summary of the public school analysis and projections are provided in Table 3.

Table 3

SUMMARY OF PRESENT SCHOOL CAPACITY AND PROJECTED ENROLLMENT

Grades	1975-1976 School Year				1976-1977 School Year	Projected Enrollment		
	Enrolled	Capacity	Excess + Deficit(-) Capacity	Percent Utilization	Capacity	1980	1990	2000
K-4	7,257	9,269	+2012	78.3	9,893	8,054	10,666	12,593
5-8	6,854	8,811	+1957	77.8	9,651	6,865	8,344	10,371
9	1,684	2,520	+836	66.8	2,520	2,019	2,454	3,050
10-12	4,640	5,705	+1065	81.3	7,205	6,030	5,902	7,818
TOTAL	20,435	26,305	+5870	77.7	29,269	22,968	27,366	33,832

APPENDIX I

REVIEW OF POPULATION PROJECTIONS

The three population projections presented in Technical Report #1 were developed using the cohort-survival method which is widely regarded as the most reliable technique for projecting population for small areas. The cohort-survival method treats the three population growth variables -- births, deaths, and migration -- individually, making it possible to base projections on alternative assumptions.

The three different cohort-survival projections, which are summarized in Table 1, are based on different assumptions regarding future migration rates and birth rates. Death rates were held constant for all three projections.

The "Low Projection" is based on the migration rates experienced between 1960 and 1970 and the relatively low birth rates experienced since 1970. This projection does not account for the growth surge experienced during the late 1960's and early 1970's.

The "Intermediate Projection" assumes that both the migration and birth rates experienced between 1960 and 1970 will remain constant. This projection does not consider the recent growth trends or the trend toward lower birth rates.

The "High Projection" uses the most recent data of the three projections. Assumed migration rates are those experienced between 1970 and 1974, and the birth rates utilized in the projection reflect the recent downward trend. While this projection is based on the most recent data, it is emphasized that these data were collected over a very short time-interval and may, therefore, reflect an erroneous trend.

TABLE 1
ALTERNATIVE POPULATION PROJECTIONS

Growth Rate	Estimated Population		
	1980	1990	2000
Low	94,000	108,000	123,000
Intermediate	98,000	117,000	140,000
High	101,000	125,000	151,000

Source: Wilmington-New Hanover Planning Department.

APPENDIX II

COST ESTIMATING PROCEDURES FOR PUBLIC SERVICES

A. WATER TREATMENT AND DISTRIBUTION

1. Treatment

a.) Capital Costs

COST ESTIMATING RELATIONSHIP

$$C_T = 300,000 Q_n^{0.68}$$

Where Q_n = Million gallons of water per day at 150 gallons per capita for each population level served.

C_T = Treatment plant capital cost at each population level.

Using the assumption that 75 percent of all new residents will be served by public water, the following water demands have been calculated:

<u>Population level</u>	<u>Q</u>
Low	6.3 mgd
Moderate	5.1 mgd
High	3.2 mgd

b.) Operating Costs

Using the water demand estimates from above, the following relationship has been used to estimate operating costs:

$$C_{TO} = 35,000 Q_n^{0.61}$$

Where C_{TO} = Treatment plant operating costs

2. Distribution

a.) Capital Costs

The capital costs for water distribution are directly related to the density of development. Therefore, the following equation provides estimates of construction costs based on the density of development in dwelling units per square mile:

$$C_D = (3560F^{0.70})(M_n)$$

Where C_D = Capital costs for distribution

F = Family units per square mile

M_n = Number of square miles developed at each population level.

Based on two assumed development densities (compact at 2 dwellings per acre and dispersed at 0.5 dwellings per acre), the following values have been used to estimate distribution costs:

<u>Population Level</u>	<u>Families Served</u>	<u>Families Per Square Mile</u>		<u>Square Miles Required</u>	
		<u>Compact</u>	<u>Dispersed</u>	<u>Compact</u>	<u>Dispersed</u>
Low	7,000	1280	320	5.5	22.0
Moderate	11,250	1280	320	8.8	35.2
High	14,000	1280	320	11.0	43.8

b.) Operating and Maintenance Costs

The Research Triangle Institute report recommends using a value of 10 percent of the capital for distribution as an estimate of annual operating and maintenance costs.

B. WASTE WATER COLLECTION AND TREATMENT

1. Treatment

a.) Capital Costs

The cost estimating relationship for the capital costs of a sewage treatment plant is as follows:

$$C_T = 440P^{0.77}(1.121)$$

Where P = the population served.

C_T = Treatment plant capital cost.

b.) Operating Costs

Operation and maintenance costs are affected by the size of the treatment plant. Manpower requirements can be reduced through automation; bulk supplies are cheaper than small quantities. However the effect of economics of scale can only be realized through increases in capital cost.

A value of 5 percent of total capital costs has been used for estimating operation and maintenance costs for the sewage treatment plant.

2. Collection

a.) Capital Costs

The development of cost estimates for a sewage collection system is very involved. It is the opinion of the staff that the cost estimates derived from the equation in the Research Triangle Report are too conservative; therefore the staff, in consultation with the City of Wilmington Engineer, has derived separate cost estimates for sewage collection.

The following assumptions have been used in preparing these estimates:

1. Collector costs per foot = \$16
2. 64,000 feet of collector lines per net developed square mile.

b.) Operating Costs

A value of 5 percent of the capital costs for sewage collection has been used for estimating operation and maintenance costs.

C. SOLID WASTE MANAGEMENT

The Research Triangle Institute report investigated the costs of providing garbage collection and disposal in various North Carolina communities and counties. Based on these studies, the following per capita costs have been recommended for estimating the costs of solid waste management:

<u>Type of Cost</u>	<u>Low Density Development</u>	<u>High Density Development</u>
Capital	\$2.00	\$1.75
Operating	2.00	1.75

D. POLICE AND FIRE PROTECTION

The basic cost components of both police and fire protection are personnel expenses, other operating expenses, and the capital expenditures required to support fire and police personnel.

The number of sworn personnel required to service each population level has been determined using recognized standards. For police and fire, a guideline of one sworn officer for every 500 persons has been used. These ratios have been supported by statewide studies.

The following assumptions have been used in estimating police and fire costs:

	<u>Police</u>	<u>Fire</u>
Average annual salary	\$7,000	\$7,000
Fringe benefits	1.115 x average annual salary	1.115 x average annual salary
Capital costs	3.5 percent of operating costs	4.5 percent of total operating costs

E. HIGHWAY COSTS

Estimates for highway costs include only non-local roads -- collectors, arterials, and expressways. It has been assumed that local roads will be provided by the developer.

The number of road miles per square mile of developed land were estimated for each population density -- 11.8 road miles/square mile for compact development and 5.0 road miles/square mile for dispersed development. These estimates were then used to determine the total road miles required to service each population level in compact and dispersed development patterns. An average cost estimate of \$292,000 was used to compute total highway costs.

A recent study by the N.C. Department of Transportation indicated that annual road maintenance costs average \$1,500 per mile. This estimate was used to determine highway maintenance costs.

**wilmington -
new hanover
comprehensive
planning program**

TECHNICAL REPORT

#6

**analysis of
septic tank limitations**

APRIL, 1976

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I. INTRODUCTION

The problem of septic tanks and sewage disposal was discussed generally in Technical Report #2 which analyzed existing land use. Since completion of that planning study, however, the Coastal Resources Commission (CRC) has expressed an expanded interest in the relationships between population, septic tanks, and water quality. In a recent memorandum (March 29, 1976), T.D. Eure, Chairman of the CRC, expressed the Commission's concern as follows:

"...the Coastal Resources Commission became concerned during its review of draft Land Use Plans submitted in November that some of the plans did not give adequate attention to the capability of the land and water resources of the area to sustain projected growth. The Commission was particularly concerned that local governments address in their plans the effects of growth on water quality and water availability in their jurisdictions. A special concern was that problems associated with waste disposal be more fully dealt with especially problems associated with the increasing use of septic tank sewage disposal systems in fragile coastal areas. This latter issue has subsequently come to be commonly referred to as the 'septic tank problem'.

Within the limits of its legal authority, the Commission is attempting to deal with these problems. However, the role which the Commission can play at this time is somewhat limited. During the land use planning phase of the implementation of CAMA, the Commission's main prerogative in this regard is to insure that the local Planning jurisdictions address in their plans the problems associated with the capabilities of the land and water resources to support projected growth, e.g. to address problems related to the proliferation of septic tank systems in coastal developments where local soil and water conditions make their use unsuitable".

The suitability of the land for the installation of septic tanks was a specific consideration in the overall analysis of the capability of the Planning Area's land to support development (Technical Report #3). However, considering the expanded concern of the CRC and the fact that septic tanks are an important planning issue in the Wilmington-New Hanover Planning Area, this report has been prepared to insure that citizens and public officials are fully aware of the extent of the septic tank problem and its implications for the future.

II. DIMENSIONS OF THE SEPTIC TANK PROBLEM

A. EXTENT OF PROBLEM

Septic tanks present a definite problem in the Planning Area. According to a recent engineering report,* pollution caused by septic tanks and agricultural runoff have been instrumental in the closing of extensive areas of New Hanover County to shellfishing (Map 1). The closure of these areas to shellfish harvesting represents a tangible loss in economic terms as well as a loss in terms of the recreational pursuits of many county residents.

In addition, the report identifies at least nineteen residential subdivisions within the Planning Area which presently experience chronic septic tank problems (Map 2).

B. SEPTIC TANK SUITABILITY

Poor soil characteristics throughout most of the Planning Area and a generally high water table through much of the year are at the base of most of the area's septic tank problems. These conditions tend to make conventional septic tank sewage disposal systems environmentally unsuited for use in urban-level development.**

A majority of the soils found in the Planning Area are not suitable for sewage disposal by conventional septic tank systems. According to the recent New Hanover County Soil Survey, it is estimated that 75 percent (87,000 acres) of the land area is unsuited for the use of conventional septic tank systems.

*Henry Von Oesen and Associates, "Greater Wilmington Area 201 Facilities Plan", November 1975, (DRAFT).

**Amos Dawson, "A Report on Legal Authorities Pertaining to the Regulation of Septic Tanks in the Coastal Area of North Carolina", N.C. Office of Marine Affairs.

Within these unsuited areas, there is a very high probability that the systems will fail within the first year's use.

C. SEPTIC TANK FAILURE

It is important to discuss what constitutes septic tank failure. There is a common misconception that if septic tank effluent does not appear on the ground surface, then the system is functioning properly. Indeed surface "breakouts" are a serious aspect of septic tank failure. When effluent appears on the ground, it constitutes a health hazard, and it may also be washed into nearby streams, contributing to the pollution of the area's surface waters.

However, there is a more subtle aspect of septic tank failure. On some sites, the septic tanks "function" by injecting untreated wastes into shallow groundwaters (generally sand aquifers). These soils are able to accept the sewage load, but offer poor treatment of the waste. Studies have shown a saturated sand to be only about 1 percent as effective in removing fecal coliform bacteria as soil of the same texture under dry, aerobic, intermittent flow conditions.*

When untreated septic wastes are injected directly into shallow groundwater, most of the resulting pollution remains within the upper few feet of the water table. The polluted groundwater then flows laterally and discharges into streams, sounds, and other surface water bodies, and usually causes deterioration of the surface water quality. Thus, improperly treated septic wastes contribute to the degradation of both groundwater and surface water.**

*B.L. Carlile, "Alternatives for Onsite Sewage Disposal in Eastern North Carolina", North Carolina State University Soil Science Department.

**Dawson, "Regulation of Septic Tanks".

D. IMPACT OF SEPTIC TANK LIMITATIONS ON GROWTH

Continued reliance on septic tanks as the primary means of sewage disposal poses a major limit for further growth and development of the Planning Area. As discussed above, the Soil Conservation Service estimates that a total of 31,500 acres in New Hanover County are suited for conventional septic tanks. Of this total, it is estimated that almost 20,500 acres, or 65 percent, are already developed or committed to development, leaving approximately 11,000 acres (17 square miles) of land which is undeveloped and which is suited for development with septic tanks (Map 3).

Using a guideline suggested by the Coastal Resources Commission for urban-type development, this area could be expected to support an overall population density of 2000 persons per square mile, considering the need for shopping areas, industries, roads, and so on, as well as residents. At this density, the unincorporated portion of the Planning Area could support a maximum of 34,000 additional people in the absence of substantial public investment in centralized sewage disposal facilities. Assuming three persons per family, this indicates a capability for an additional 11,300 dwellings on septic tanks.

III. RECOMMENDED ACTIONS

In view of the Planning Area's existing septic tank problems and the severe development constraints presented by the soil conditions, it is clear that both City Council and County Commissioners must take every feasible action to insure implementation of the "201 Facilities Plan" for the Greater Wilmington Area which is currently being reviewed by state and federal agencies. This plan would provide centralized facilities with the capacity to eventually provide sewage collection, treatment, and disposal services to most of the Planning Area. Implementation of the "201 Plan" would address existing septic tank problems on a priority basis, but it would also prevent additional water pollution problems from further development.

Centralized sewerage facilities are not, however, an immediate solution to the Planning Area's water quality problems. Some pessimistic estimates place the first phase of the "201 Facilities Plan" at least ten years away. Therefore, interim measures are required to insure that further development using on-site sewage disposal does not further degradate the quality of the Planning Area's surface and groundwater resources.

The New Hanover County Board of Health has adopted one of the most stringent septic tank ordinances of any North Carolina coastal county. However, during the implementation phase of the land use planning program, at least three major aspects of this ordinance should be reviewed:

1. "Grandfather" clause -- Section 3.312 of the septic tank ordinance allows the Health Director to grant septic tank permits to substandard (soil conditions and dimensions) lots which were platted before the effective date of the ordinance. In at least one area of the county, septic tank permits are being issued for 5000 square foot lots which have "very severe" rated soil types. This practice, in the opinion of the Planning Staff, is questionable.

2. Minimum setbacks -- The existing ordinance requires that every septic tank system be located at least 25 feet from any canal or stream, at least 50 feet from any water supply. Some authorities, however, recommend setbacks of 100 to 150 feet from estuarine waters (N.C. Division of Marine Fisheries, and John Clark in Coastal Ecosystems). Therefore, the setback requirement for septic tank systems should be reviewed.
3. Minimum lot sizes -- Where soil conditions are favorable, the septic tank ordinance permits septic systems on 15,000 sq. ft. lots. However, opinions expressed by sanitary engineers from the N.C. Division of Environmental Management (Coastal Resources Commission Memorandum of March 29, 1976) indicate that widespread development of septic tanks at this density may result in the pollution of ground and surface water.

In addition to reviewing these provisions of the Board of Health Septic Tank Ordinance, it is important to insure that the Planning Area's land use policies complement the septic tank ordinance in the proper regulation of septic tanks. Specifically, it is essential to insure that the density of development using on-site sewage disposal methods is consistent with the capability of the land. Basically, it is necessary for the area's land use policies, as expressed in various land use and development ordinances, to go beyond the issue of public health, which is the main focus of the Board of Health ordinance, to a broader objective of maintaining and improving water quality.